

NATURAL HISTORY,

GENERAL AND PARTICULAR,

BY THE

COUNT DE BUFFON,

TRANSLATED INTO ENGLISH

ILLUSTRATED

With three hundred and one COPPER-PLATES,

AND OCCASIONAL

NOTES AND OBSERVATIONS

BY


THE TRANSLATOR.

VOLUME III.

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NATURAL HISTORY

GENERAL AND PARTICULAR

ADVERTISING MEN

1609/3788.

the Natural History of the United Kingdom of Great Britain and Ireland

thinks it necessary to mention after citation of the original, which, to some readers, might otherwise appear of not clearly following the original.

In the history of domestic animals, the Count de Buffon has not given the SYNONYMS of authors. The same omission sometimes happens in his account of wild animals. In all these instances, the Translator has added the SYNONYMS from other sources of information.

Another circumstance must be noticed. Many of the original work were published more than thirty years ago. The Count de Buffon is quoted from the editions of books which were at that time the best. But a number of these books have since undergone different editions, and the authors have made considerable additions to their descriptions, and even in the original work, the Translator has made some alterations.



ADVERTISEMENT.

AS the Natural History of Quadrupeds commences in this Volume, the Translator thinks it necessary to mention a few circumstances, which, to some readers, might have the appearance of not closely following the original.

In the history of domestic animals, the **COUNT DE BUFFON** has not given the **SYNONYMA** of authors. The same omission sometimes happens in his account of wild animals. In all these instances, the Translator has added the **SYNONYMA** from other sources of information.

Another circumstance must be noticed. Many articles of the original work were published near thirty years ago. The **COUNT DE BUFFON** quoted from the editions of books which were at that time the last. But, as many of these books have since undergone different impressions, and the authors have made considerable amendments in their definitions, and even in their systematic arrangements, the Translator, in justice to these Naturalists, has referred to the passages and pages as they appear in the corrected editions. Hence the references in the translation frequently correspond not with those of the original. For the

iv ADVERTISEMENT.

the same reason, several strictures upon the writings of Sir Charles Linnaeus, and others, could not be inserted with any degree of propriety; because many of the inaccuracies, which the COUNT reprehends, have now no existence.

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VII. Of the Sense of Hearing
VIII. Of the Sense in General
IX. Of the Varieties of the Human Species

I. Dissertation on the Nature of Animals
II. Of Domestic Animals

III. The Natural History of the Horse
IV. Of the Ass

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D I R E C T I O N

I. The first part of the work is a list of the names of the persons who have been mentioned in the preceding pages. This list is given in the form of a table, and is intended to be used as a reference for the reader. The names are arranged in alphabetical order, and are given in full, with their titles and positions. The list is divided into two parts, the first part containing the names of the persons who have been mentioned in the preceding pages, and the second part containing the names of the persons who have been mentioned in the preceding pages.

E R R A T A.

- Page 17. line 13. *for colour read colours.*
135. 15. *for locust read locusts.*
173. 19. *for whom read which.*
211. 10. *for walking read watching.*
232. 24. *for and produce read and they produce.*
249. 9. *for existences read existence.*
277. 14. *dele or a dog for its master.*
304. 4. *from the bottom, for he behoved to be,
read he must have been.*
351. 7. *from the bottom, for produce read pro-
duces.*
369. 4. *for riders read rider.*
387. 12. *for pocks read bags.*
431. 3. *for augment read augments.*
511. 6. *from the bottom, dele is.*

DIRECTIONS to the BINDER.

- Place Plate XI. between page 322 and page 323.
- XII. between page 422 and page 423.
- XIII. between page 460 and page 461.
- XIV. and XV. between page 482 and page 483.
- 2d XV. 3d XV. between page 484 and page 485.
- XVI. XVII. XVIII. XIX. between page 498 and
page 499.
- XX. XXI. XXII. and XXIII. at the end of the
volume.

GENERAL

1. The first of the following is the name of the person who has been appointed to the position of Secretary of the Board of Directors of the Corporation, and who is authorized to execute all the business of the Corporation in connection with the same.

2. The second of the following is the name of the person who has been appointed to the position of Treasurer of the Corporation, and who is authorized to execute all the business of the Corporation in connection with the same.

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THE
NATURAL HISTORY
OF
MAN.

SECT. VI.

Of the Sense of Seeing.

WE have already described the parts of which the human body consists; and shall now proceed to examine those curious organs by which sensations are conveyed to the mind. In this investigation, we shall endeavour to point out the uses of the different senses, and to mark those errors to which we are, in some measure, subjected by Nature.

In the human foetus, the eyes are early formed; in the chicken also, they are the first double organs which make their appearance; and, in the eggs of lizards, and of several species of birds, I have remarked, that the eyes were more prominent and advanced in growth than any other double parts of the body. In viviparous animals, it is true, and particularly in the human foetus, the eyes are not so large, in proportion,

as in the oviparous; but still they are more quickly expanded than the other parts of the system. The same remark applies to the organ of hearing. The small bones of the ear are fully formed before the other bones of the body have acquired any degree of solidity or bulk. In the seventh month, the whole bones of the ear are perfectly solid, and have acquired all the density they possess in the adult state. It is, therefore, apparent, that those parts which are furnished with the greatest quantity of nerves, are first formed and expanded. We formerly remarked, that the vesicles which contain the brain and cerebellum, and that which contains the spinal marrow, appear first. The spinal marrow is a fundamental and essential part of the body, and is therefore first formed. Hence the nerves exist before any of the other parts of the body, and those organs which are most amply supplied with them, as the ears and eyes, are most quickly expanded.

Upon examining the eyes of an infant some hours after birth, it is easy to perceive, that it can make no use of them: This organ not having acquired a sufficient degree of consistence, the rays of light make only a confused impression on the retina. About a month after birth, the eye seems to have acquired that tension and solidity which are necessary for the proper transmission of the rays of light; but, even then, infants are incapable of fixing their eyes upon any object:



object : They roll and move them to all sides, without being able to distinguish the objects to which their eyes are directed. In six or seven weeks, however, they begin to fix their attention upon luminous objects. But this exercise only tends to fortify the eye, without conveying any exact perception of different objects ; for the first great error in vision, is the inverted representation of objects upon the retina : And, till children learn the real position of bodies by the sense of feeling, they see every object inverted. A second error in the vision of infants arises from the double appearance of objects ; because a distinct image of the same object is formed on the retina of each eye. It is only by the experience of feeling bodies, that children are enabled to correct this error ; by the frequent handling of objects, they gradually learn that they are neither double nor inverted ; and custom soon makes them imagine they see objects in the order and position in which they are represented to the mind by the sense of touching. Hence, if we were deprived of feeling, our eyes would deceive us, both with regard to the position and number of objects.

The inversion of objects is a result of the structure of the eye ; for the rays which form the images of these objects, cannot enter the pupil without crossing each other. This admits of an easy proof : When light is transmitted through

a small hole into a dark chamber, the images of the objects from without are represented on the wall in an inverted position; because all the rays reflected from the different points of the object cannot pass through this small hole, in the same extent and position as they proceed from the object, unless the hole be of equal dimensions with the object. But, as every part of the object reflects images of itself on all sides, and, as the rays which form these images proceed from every point of the object as from so many centres, none of them can pass through the hole but those that arrive at it in different directions. Hence the hole becomes the centre of the whole object; at which the rays flowing from the lower, as well as the higher parts of the object, arrive in converging directions; and, of course, they must cross each other at this centre, and represent the picture of the object on the opposite wall in an inverted position.

It is equally easy to show that we see all objects double: If, for instance, we look at an object with the right eye, we will find that it corresponds with a certain point of the wall; if we look at the same object with the left, it then corresponds with a different point; and, lastly, when we look at it with both eyes, it appears in the middle between these points. Thus an image of the object is formed on both eyes, one of which appears on the left and the other on the

the

the right; and we perceive it to be single and in a middle situation, because we have learned to correct this error of vision by the sense of touching. In the same manner, if we look with both eyes at two objects, nearly in the same direction, by fixing our eyes on the nearest, we perceive it to be single; but the farthest appears to be double; and, if we fix our eyes on the farthest, it appears to be single, while the nearest is perceived to be double. This is an evident proof, that we see all objects double, though we conceive them to be single; and that, though we form an accurate idea of their real situation, yet we actually see them where they are not. If, therefore, the sense of seeing were not constantly rectified by that of touching, we would be perpetually deceived as to the position, number, and situation of objects; we would perceive them to be inverted, double, and to the right or left of their real situations; and, instead of two, if we had 100 eyes, we would still conceive objects to be single, though they were in reality multiplied a hundred fold.

Thus a separate image of every object is formed in each eye; and, when the two images fall on corresponding parts of the retina, or those parts which are always affected at the same time, objects appear single, because we are accustomed to judge of them in this manner. But, when the images of objects fall upon parts of the retina which are not usually affected at the same time,

time, they then appear double, because we have not acquired the habit of rectifying this unusual sensation.

Mr Cheffelden, in his anatomy *, relates the case of a man who had been affected with a strabismus, in consequence of a blow on the head. This man saw every object double for a long time. But he gradually learned to correct this error of vision, with regard to objects which were most familiar to him; and, at last, he saw every object single as formerly, though the squinting of his eyes was never removed. This is a proof still more direct, that we really see all objects double, and that it is by habit alone we learn to conceive them to be single. If it should be asked, why children sooner acquire the faculty of correcting this deception than adults whose eyes have been distorted by accident? it may be replied, that children, having acquired no opposite habits, less time is, of course, necessary to correct the errors of their sensations; but that adults, who have for many years been accustomed to perceive objects single, because their images fall upon corresponding parts of the retina, have a contrary habit to oppose, and, consequently, must require a long time before they can efface all the traces of it.

The sense of seeing conveys no idea of distances. Without the aid of touching, all objects would appear to be within the eye, because it is there

* P. 324.

there alone that their images exist: And an infant, who has had no experience of the sense of touching, must consider all external bodies as existing in itself: They only appear larger or smaller, according as they approach or recede from the eye. A fly, when near the eye, will seem larger than an ox or a horse at a distance. Thus an infant can have no idea of the relative magnitude of objects, because he has no notion of the different distances at which he views them. It is only after measuring space by the extension of the hand, or by transporting their bodies from one place to another, that children acquire ideas concerning the distances and magnitudes of objects. Before this period, they can form no judgment of the distance or magnitude of an object, but by the image painted on the retina. Their ideas of magnitude entirely result from the angle formed by the extreme rays reflected from the superior and inferior part of the object: Of course, every near object must appear to be large, and every distant object small. But, after having acquired, by touch, ideas of distances, the judgment concerning magnitude begins to be rectified: They trust not alone to the apparent magnitude conveyed by the eye: They endeavour to investigate the distance; they try, at the same time, to distinguish the object by its form; and then they judge of its magnitude.

If we judge by the eye alone, and have not acquired the habit of apprehending the same objects

jects to be equally large, though viewed at different distances, the first soldiers, in a file of 20, must appear much larger than the last. But we know the last soldier to be equally large with the first; and hence we judge him to be of the same dimensions. And, as we have the habit of considering the same object to be of equal magnitude at all ordinary distances, we are never deceived on this head, excepting when the distance is too great, or when the interval is in an uncommon direction. A distance ceases to be familiar to us whenever it is too large, or rather when the interval is vertical instead of horizontal. The first ideas of the comparative magnitude of objects we acquire either by measuring their relative distances by the hand, or by moving the whole body. But all the experiments by which we commonly rectify the errors of vision, with regard to distances, are made horizontally. We have no acquired habit of judging of the magnitude of objects which are elevated above, or sunk below us; because we are not accustomed to measure in this direction by the touch. Hence, when viewing men from the top of a tower, or when looking up to a cock or a globe on the top of a steeple, we think these objects are much more diminished, than if we viewed them at equal distances in a horizontal direction.

Though a small degree of reflection be sufficient to convince us of the truth of these positions, it may still be of use to relate the facts which

which confirm them. The celebrated Cheselden couched cataracts in both eyes of a lad of 13 years of age, who had been blind from his birth. The operation succeeded; and Mr Cheselden carefully observed the manner in which the young man was affected by the sense of seeing. These observations he published in the Philosophical Transactions *. This young man was not absolutely blind: Like other persons affected with cataracts, he could distinguish night from day, and even black from white; but he had not the most distant conception of the figure of bodies. The operation was first performed on one eye. When he saw for the first time, he was so far from judging of distances, that he believed every object touched his eyes, in the same manner as every thing he handled touched his skin. Objects of a regular figure, and having plain surfaces, were most agreeable to him, though he was still incapable of forming any judgment as to their form, or telling why they afforded him more pleasure than others. His ideas of colours, before the operation, were so faint, that, after receiving his sight, he was unable to distinguish one from another. He insisted that the colours which he then saw were not the same he was formerly acquainted with. He knew not the figure of any object; nor could he distinguish one from another, however different in form and in magnitude.

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* See Phil. Transf. No. 402. and Tatler, Art. 55.

When presented with things which were formerly familiar to him, he observed them with attention, that he might be able to know them afterwards. But, as he had too many objects to recognise at once, he forgot the greatest part of them; and, from his commencing to distinguish objects, he did not retain in his memory one out of a thousand. Those objects and persons which were formerly most beloved by him, he was astonished to find that they were not also the most agreeable to his sight. It was more than two months before he could perceive that pictures were the representations of solid bodies. Previous to this period, he considered them only as plain surfaces diversified by different colours. But, after he began to perceive that pictures represented solid bodies, he expected to recognise their seeming inequalities by touching the canvas; and was perfectly astonished when he found the whole uniformly smooth. He asked, whether the deception arose from the sense of feeling or that of seeing? He was then shown a miniature portrait of his father, contained in his mother's watch-case. He recognised the resemblance of his father; But he inquired with amazement how so large a countenance could possibly be contained in so small a compass; for it appeared to him equally strange, as that a bushel should be held in a pint vessel. At first, his eye could support only a small quantity of light; and every object seemed much larger than

than the life. But, after he had seen objects of large dimensions, former objects appeared to be proportionally diminished. He had no conception that any object exceeded the limits of those he had already seen. He knew that his own apartment was only a part of the house, and yet he was unable to comprehend how the house should be larger than his chamber. Before the operation, he expected not much pleasure from the acquisition of the new sense that had been promised him, excepting what should arise from his being enabled to read and write. He alledged, for example, that he could receive no new satisfaction from walking in the garden, because he already knew every corner of it, and could walk there with great ease and freedom. He had even remarked, that his blindness gave him the advantage of walking in the night with more confidence and security than those who enjoyed the benefit of sight. But, after he began to have the proper use of this new sense, he was transported beyond measure. He declared that every new object afforded a fresh delight; and that the pleasure he felt exceeded the powers of expression. About twelve months after the operation; he was conducted to Epsom, from which there is a beautiful and extensive prospect. He was charmed with the view; and he called this landscape a new mode of seeing.

About

About a year after the first operation, the cataract on the other eye was couched with equal success. With this second eye he perceived objects to be much larger than with the other, but not so large as when he first received sight; and, when he viewed the same object with both eyes, he said that it appeared to be twice as large as with the first eye alone. But, after he procured the use of both eyes, he did not see objects double, or, at least, Mr Cheffelden could not be certain that he did.

Mr Cheffelden records several other examples of blind men, who had no remembrance of light, restored to vision by the same operation; and he assures us, that, when they first obtained the use of their eyes, they expressed their perceptions in a similar manner, though not so minutely. And he remarks, upon the whole, that as, during their blindness, they had no occasion to move their eyes, it cost them much difficulty and a considerable time, before they could acquire the faculty of directing them to the objects they wished to examine*.

As, from particular circumstances, we can have no just idea of distance, and, as we cannot judge concerning the magnitude of objects, but by the largeness of the angle or image formed in the eye, we must necessarily be liable to deceptions with regard to these articles. Every body knows how liable we are, when travelling in the night, to mistake a bush that is near us
for

* See Lettre sur les aveugles, à l'usage de ceux qui voient.

for a tree at a distance, or a distant tree for a bush which is at hand. In the same manner, if we are unacquainted with the figure of objects, we cannot form any idea, either of their distance or magnitude: A fly passing with rapidity at some inches from the eye, would, in this case, appear like a bird at a considerable distance; and a horse, standing in the middle of a plain, would not seem larger than a sheep. But, as soon as we knew it to be a horse, it would instantly appear as large as the life, because we have the power of correcting the deception of vision.

Whenever, therefore, we are benighted in a part of the country with which we are unacquainted, being unable, on account of the darkness, to judge of the distance or figure of objects, we are every moment liable to all the deceptions of vision. This is the source of that dread which most feel in the dark, and of those spectres and terrible figures which so many persons tell us they have seen in the night. Though such figures, it is commonly asserted, exist only in the imagination; yet they may have a real existence in the eye; for, whenever we have no other mode of judging of an unknown object but by the angle it forms in the eye, its magnitude will uniformly increase in proportion to its propinquity. If it appears, when at the distance of 20 or 30 paces, to be only a few feet high, its height, when within two or three feet

feet of the eye, will be many fathoms. An object of this kind must naturally excite terror and astonishment in the spectator, till he approaches and recognises it by actual feeling; for the moment a man knows an object, the gigantic appearance it assumed in the eye instantly diminishes, and its apparent magnitude is reduced to its real dimensions. But if, instead of approaching such an object, the spectator flies from it, he can have no other idea of it, but from the image which it formed in his eye; and, in this case, he may affirm with truth, that he saw an object terrible in its aspect, and enormous in its size. Thus the notions concerning spectres is founded in nature, and depend not, as some philosophers affirm, upon the imagination alone.

When we are unable to form an idea of the distance of objects by a knowledge of the space between them and the eye, we endeavour to judge of their magnitude by distinguishing their figures. But, when the figures are not distinguishable, and when we view a number of objects of the same form, we conceive those that are most brilliant to be nearest, and those which are most obscure to be at the greatest distance. This mode of judging gives rise to deceptions of a singular nature. When a multitude of objects are disposed in a right line, as the lamps on the road from Versailles to Paris, of the proximity or remoteness of which we can only judge by the different quantities of light they transmit to the eye,

eye, it frequently happens, when viewed at the distance of an eighth of a league, that the lamps appear to be on the right hand, in place of the left. This deception is an effect of the cause above mentioned; for, as the spectator has no other criterion to judge of the distance of the lamps, but the quantity of light they emit, he thinks the most brilliant of them is nearest to his eye. Now, if the first two or three lamps should happen to be most obscure, or, if one in the whole range was more brilliant than the rest, that one, to a spectator, would seem to be the first, and all the others, whatever might be their real situation, would seem to be placed behind it. This apparent transposition could not be effected by any other means than a change of situation from left to right; for, in a long range of objects, we cannot apprehend what is really behind to be situated before any one of these objects, without seeing on the right what is on the left, or on the left what is on the right.

I have thus mentioned the principal defects of the sense of seeing; and shall now proceed to examine the nature, properties, and extent of that admirable organ by which we are enabled to have a communication with the most distant objects. Sight is a species of touching, but very different from the common species of that sense. Before we can touch any object, we must either approach it with some part of our body, or it must approach us. But, with the eye, we can
touch

touch any object, however distant, if it transmits a sufficient quantity of light to make an impression on, or if its picture forms a sensible angle in, the eye. The smallest visible angle is about one minute. This angle, when an object is viewed at the greatest distance of vision, is about the 3436th part of the diameter of that object. An object, for example, of a foot square, ceases to be visible at the distance of 3436 feet. A man of five feet high is not visible beyond the distance of 17,180 feet, when the sun shines.

But, with regard to the extent of human vision, an observation occurs, which seems to have escaped all the writers on optics: The extent of our sight diminishes or augments in proportion to the quantity of light that surrounds us, supposing the illumination of the object to remain the same. If the same object which we see during the day at the distance of 3436 times its diameter, were equally illuminated during the night, it would be visible at a distance 100 times greater. A candle is visible in the night at the distance of more than two leagues; that is, supposing the diameter of the luminary to be one inch, it would be visible at the distance of 316800 times the length of its diameter. But, in the day, this candle would not be discernible beyond ten or twelve thousand times the length of its diameter. The same remark is applicable to all objects, when viewed during the day or the night,

night. We may, therefore, conclude, that the extent of our vision is much greater than our first supposition; and that the reason why we are often unable to distinguish distant objects is less owing to a defect of light, or to the smallness of the angle under which they are painted in the eye, than to the profusion of rays reflected from intermediate objects, which, by their brilliancy, prevent us from perceiving the fainter and more diverging rays that proceed from distant objects. The retina of the eye is like a canvas upon which objects are painted. The colour of those pictures are bright or obscure, in proportion to the distances of the objects represented. When objects are very remote, their pictures on the retina are so faint, that they are entirely obliterated by the vigorous and lively impressions made on the eye by nearer objects, with which we are every where environed. But, when the intermediate objects emit only a feeble light, compared with that which proceeds from remote objects, as, for example, when we view a luminous body in the night-time, then the distant object makes a distinct picture on the retina, and becomes perfectly visible. It is a consequence of these facts, that a man, by placing himself in the dark, and employing a long tube, may make a telescope, which will have a considerable effect even during the day. For the same reason, a man at the bottom of a deep pit can see the stars at noon; and this fact was not

unknown to the ancients, as appears from the following passage of Aristotle: 'Manu enim admota, aut per fistulam, longius cernet. Quidam ex foveis puteisque interdum stellas conspiciunt.'

We may, therefore, affirm, that the human eye is capable of being affected with objects which subtend not an angle above a second, or less, even when they reflect no more light than when they were seen under an angle of one minute; and, consequently, that the powers of this organ are greater than was formerly imagined. But, if objects, without forming a greater angle, were furnished with a more intense light, we would see them at still greater distances. A small taper, when vivid, is seen much farther than a flambeau that emits a dim light. In order to determine the utmost distance at which an object can be rendered visible, three things fall to be considered: 1. The largeness of the angle formed in the eye; 2. The degree of light with which the neighbouring and intermediate objects are illuminated; and, 3. The intensity of the light proceeding from the object itself. Vision is affected by each of these causes; and it is only by estimating and comparing them, that we can determine the distance at which any particular object can be discerned. The following is a demonstrative proof of the influence of the intensity of light upon vision. Telescopes and microscopes are known to be instruments of the same

same kind, each of them increasing the visible angle of objects, whether they be really minute, or appear so on account of their distance. Why then do telescopes with difficulty magnify objects a thousand times, when a good microscope magnifies them more than a million? This difference, it is apparent, proceeds only from the degree of light; for, if we could illuminate distant objects with an additional quantity of rays, they would appear infinitely clearer, though seen under the same angle; and telescopes would have the same effect upon distant objects as microscopes have upon minute bodies. But this is not a proper place for expatiating on these subjects.

The distance at which any object can be seen is seldom the same in both eyes. There are few men who have both eyes equally strong. When this inequality is great, the strongest eye is most generally employed, which is the cause of squinting, as I have elsewhere proved*. When both eyes are equally strong, and directed to the same object, one would imagine that the vision would be doubly distinct; but the difference has been found by experiment to be only one 13th part†; and this phaenomenon may admit of the following solution. The two optic nerves, near the place where they come out of the skull, unite, and then separate by an obtuse angle before they enter

* See Mem. de l'Acad. anné 1743.
essay's on distinct and indistinct vision.

† See Jurin's

enter the eyes. The motion communicated to these nerves by the impression of objects on the retina, cannot be transmitted to the brain without passing the united part. Hence these two motions must be combined, and produce a similar effect, as when two bodies moving upon two sides of a square, and impinging on a third, make it move in the diagonal. Now, if the angle were about 115 or 116 degrees, the diagonal would be to the side as 13 to 12 , which is the same ratio that the sensation resulting from both eyes bears to that which results from one. The angle formed by the two optic nerves being nearly equal to that above supposed, the loss of sensation may be attributed to this position of the nerves; and this loss will always increase in proportion to the greatness of the angle.

Short-sighted persons are generally supposed to see objects larger than other men: But the reverse is the truth; for they actually see them diminished. I myself am short-sighted, and my left eye is stronger than my right. I have a thousand times examined the same objects, as the letters of a book, at the same distance, first with the one eye, and then with the other, and uniformly found that objects appeared both clearest and largest to the left eye; and, when I distorted one of my eyes to make an object appear double, the image presented to the right eye was less than the other. I cannot, therefore, hesitate in pronouncing, that the more short-sighted any

man

man is, he sees objects proportionally diminished. I examined several persons who had eyes unequal in strength; and all of them declared that they saw objects larger with the strong than with the weak eye. This phaenomenon is perhaps the effect of habit; for short-sighted people, being accustomed to approach close to objects, and to view only a small portion of them at a time, their eyes acquire a standard of magnitude much less than other men, who can take in at once all the parts of larger bodies.

Short-sightedness has been often ascribed to a roundness or prominence of the eyes. But this cause is not satisfactory; for some have suddenly become short-sighted, as the young man mentioned by Mr Smith in his optics *, who became short-sighted on coming out of a cold bath, and who, from that period, was always obliged to use a concave glass. It cannot be supposed that the crystalline and vitreous humours were all at once inflated to such a degree as to produce this difference in vision. Short-sightedness may as well proceed from the respective position of the different parts of the eye, and especially of the retina, as from the form of the humours; it may proceed from a less degree of sensibility in the retina, from a smallness of the pupil, &c. In the two latter cases, it is true, concave glasses would be useless, and even hurtful; in the two former, they may be employed with advantage.

But

* Vol. 2. p. 10.

But still, objects seen through these glasses are neither so distinct, nor perceived at such a distance, as other men see them with the naked eye; because short-sighted persons, as formerly remarked, see the pictures in a diminished form, and concave glasses diminish them still farther: Whenever, therefore, these pictures become so small as to make too faint an impression on the retina, they cease to be visible; consequently, people who labour under this defect, see not so far with the assistance of glasses as other men do with their eyes.

As the eyes of infants are less than those of adults, they must likewise see objects less; because the greatest angle which an object can form in the eye must always be proportioned to the dimensions of the retina: If the field of the retina, where the pictures of objects are formed, be supposed to be half an inch in adults, it will not exceed a third or a fourth of an inch in infants. Children, of course, cannot see so far as adults; for, as objects appear less to them, they must sooner become invisible. But as, in infants, the pupils are larger, in proportion to the size of their eyes, than those of adults, they may derive some small advantage from this circumstance.

Old men, as the humours of their eyes are said to be dried up, ought to see nearer than young men: But the reverse is true; for old
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men see best at a distance. This alteration cannot proceed entirely from a diminution, or a flattening of the humours of the eye, but rather from a change of position between its parts, as between the cornea and the crystalline, or between the vitreous humour and the retina. This may be easily understood, by supposing that the cornea becomes more solid as we advance in years, and, consequently, that it cannot readily assume that convexity which is necessary in order to see near objects; and, as it must be flattened by drying, this circumstance alone is sufficient to make old men see best at a distance.

Clear and distinct vision, though different in their nature, are terms very generally confounded by writers on optica. We see an object *clearly*, whenever it is sufficiently illuminated to enable us to form a general idea of its figure; but we see it not *distinctly*, till it be so near that we can recognise all its parts. When we view a distant tower, we see it clearly as soon as we perceive it to be a tower; but we see it not distinctly, till we approach so near as to be able to determine not only its general dimensions, but to distinguish the parts of which it is composed, as the order of architecture, the materials, the windows, &c. We may, therefore, see an object clearly without seeing it distinctly, and we may see it distinctly without seeing it clearly; because

distinct

distinct vision implies a successive examination of the different parts of objects. Old men see clearly, but not distinctly. They perceive large or luminous objects at a distance; but they are unable to distinguish small objects, as the characters of a book, without the assistance of magnifying glasses. Short-sighted persons, on the contrary, see small objects distinctly; but they have no clear vision of large objects, unless they are diminished by concave glasses. A great quantity of light is necessary for clear vision, and a small quantity is sufficient for distinct vision. Hence short-sighted people see better in the night than other men.

When an object is too brilliant, or when the eye fixes too long upon the same object, the organ is injured or fatigued, vision becomes indistinct, and the image of the object, having made an impression too violent, or remained too long on the retina, seems, for some time, to be painted on every body we look at. But I will not enlarge on this subject, because I have elsewhere given a full explication of it*. I shall only observe, that nothing, perhaps, is more destructive to the eye than too great a quantity of light. Blindness is exceedingly frequent in the northern regions, where the snow, illuminated by the rays of the sun, obliges travellers to cover their eyes with crape, to prevent the dangerous,

* See Mem. de l'Acad. année 1743.

dangerous, and often sudden, effects of too much light. In the sandy deserts of Arabia, the reflection of the light is so violent, that the eyes are unable to support it. Such persons, therefore, as are obliged to write or read long at a time, should beware of using a strong light.

Vol. III. D I S E C T.

S E C T VII.

Of the Sense of Hearing.

THE sense of hearing, like that of seeing, conveys perceptions of distant objects; it is, of course, subject to similar errors, and must deceive us, when we have no opportunity of rectifying, by the touch, the ideas it excites. The sense of hearing communicates no distinct intelligence of the distance of the sonorous bodies. A great noise at a distance, and a small one when near, produce the same sensation; and, unless we derive aid from the other senses, we cannot distinguish the distance of the one from that of the other.

When we hear an unknown sound, we can neither judge of the distance, nor of the momentum of the stroke which gives rise to it. But, whenever we can ascertain the species of any individual sound, we are able to guess both at the distance and momentum of the stroke. If, for example, we hear the report of a cannon, or the sound of a bell, we compare them with those of the same kind which we have formerly heard, and form a gross judgment both of their distance and momentum.

Every

Every body that impinges on another produces sound: This sound, in non-elastic bodies, is simple, but multiplied in those which are elastic. When we strike a bell, a single stroke produces a sound, which is successively repeated as long as the sonorous body continues to vibrate. If, therefore, we had not acquired the habit of judging every sound to be single which is produced by one stroke, we would conceive all sounds to be multiplied. On this subject, I shall relate an incident that happened to myself. When lying in bed half asleep, my clock struck, and I counted five strokes of the hammer on the bell, which I heard distinctly. I immediately rose, and, upon examination, found that it was only one o'clock, and that only one stroke had been struck on the bell; for there was not the smallest derangement in the machinery. After a little reflection, I concluded, that, if we knew not from experience that a single stroke should produce but one sound, every vibration of a bell would be heard as a separate sound, and as if several strokes had successively been repeated on the sonorous body. When I heard the clock strike, I was in the same situation with a person who had heard for the first time, and who, having no idea of the manner in which sound is produced, would judge only by the impression made on the ear; and, on this supposition, he would hear as many distinct sounds as there were successive vibrations.

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It is the number of vibrations excited in elastic bodies, which constitutes the tone of sound. There is no tone in a simple sound. The report of a gun, or the crack of a whip, produce different sounds; but they have no tone. It is the same with every instantaneous sound. Tone consists in the duration of the same sound for a certain time. This duration of sound may be effected in two different ways: The first, and most common, is the succession of vibrations in elastic and sonorous bodies. But the same effect may be produced in non-elastic bodies by a quick repetition of strokes; for a succession of vibrations acts upon the ear in the same manner as if each vibration were a separate stroke.

By considering, in this view, the production of sound, and the different tones which modify it, we shall find, that a repetition of equal strokes is necessary to produce a tone from bodies incapable of vibration. If the number of equal strokes be augmented in the same time, the tone will only be rendered more equal and perceptible, without changing either the sound or the tone produced by the strokes. But, if the force of the equal strokes be augmented, the sound will be stronger, and the tone may be changed. For example, if the force of the stroke be doubled, it will produce a sound doubly strong; and if the tone of the former was an octave, that of the latter will be doubly grave.

May

May not elastic bodies, when set a vibrating by a single stroke, be regarded as bodies whose figure and length precisely determine the force of the stroke, and limit it to the production of a certain sound only? If one stroke on a bell have only half the force of another, it will not be heard at so great a distance, but it will still produce the same tone. It is the same with the string of an instrument; the same length gives always the same tone. Should not this lead us to think, that, in the explication of the production of different tones by the greater or smaller number of vibrations alone, we mistake the effect for the cause? for, the vibrations of sonorous bodies being nothing else than what is produced in non-elastic bodies by a frequent repetition of equal strokes, a greater or lesser number of vibrations should have no more influence, with regard to tones, than the quicker or slower repetition of strokes made upon bodies which do not vibrate. Now, this quicker or slower repetition of strokes produces no change; neither ought the frequency of vibrations; and the tone, which, in the first case, depends upon the force of the stroke, depends, in the second case, upon the volume of the sonorous body. If it be double the thickness, and of the same length, or double the length, and of the same thickness, the gravity of the tone will be double, in the same manner as the tone of a non-elastic body

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is doubly grave, when struck with a double weight or force.
 If we strike a body incapable of vibrating, with a double force, or a double mass of matter, it will produce a sound doubly grave, or an octave lower; for it is the same thing as if we struck with two equal masses instead of one of them, which would necessarily double the intensity of the sound. Suppose, then, that two non-elastic bodies are struck, the one with a single mass, the other with two, each of them equal to the first; a sound would be produced by the first body, whose intensity would be only one half of that produced by the second. But, if we strike one of these bodies with two masses, and the other with three; in this case, the first body would produce a sound, the intensity of which would be one third less than that produced by the second. In the same manner, if we strike the one body with three equal masses, and the other with four, the former will produce a sound, the intensity of which will be one fourth less than that produced by the latter. Now, in comparing numbers, we comprehend them most easily in the proportions of one to two, one to three, one to four, &c.; and, of all the proportions comprehended between the single and the double, those which we perceive with the greatest facility, are two to one, three to two, four to three, &c. Thus, in judging of sounds, the octave corresponds best with the original

original sound, then the fifth, and then the fourth; because these sounds are in the above proportion. For, if we suppose the small bones of the ear to be hard unelastic bodies, which receive strokes of equal masses of matter, we would more easily refer the sound produced by one of them to a certain standard, if the other sounds were produced by masses that were proportioned to the first, as 1 to 2, 2 to 3, or 3 to 4; because these are the proportions which the mind recognizes with the greatest facility. Thus, in considering sound as a sensation, the pleasure arising from harmony appears to consist in the proportion between the fundamental sound and the others which succeed it. If these other sounds measure exactly the fundamental sound, they will be always harmonious and agreeable; but, when they are incommensurable, they will be harsh and discordant.

It may be asked, why should one proportion, when it is exact, be more agreeable than another, which is less exact? I answer, that the cause of pleasure originates from this justness of proportion; for, whenever our senses are acted upon in this manner, an agreeable sensation is the result; and disproportion, on the contrary, is always disagreeable to us. We may recollect what was said concerning the blind man who received his sight from the dexterity of Mr. Cheselden. When he began to see, regular objects were more agreeable to him than those which were rough and irregular. It is, therefore, unquestionable,

able, that the idea of beauty, and the pleasing sensations we receive by the eye, originate from regularity and proportion. It is the same with the sense of touching: Smooth, round, and uniform bodies afford us more pleasure than those which are rough and unequal. Thus the pleasure arising from the sense of touching, as well as from that of seeing, is founded in the proportion of objects. Why, therefore, should not the pleasures of the ear proceed from the proportion of sounds?

Sound, like light, is not only propagated at a distance, but is capable of being reflected. The laws which regulate the reflection of sound are not indeed so well understood. All we know is, that sound is reflected when its motion is interrupted by hard bodies: A mountain, a house, a wall, reflect sound, and sometimes so perfectly, that we imagine it proceeds from a direction opposite to that of its original motion. Smooth concave surfaces, as vaults, hollow rocks, &c. produce the most distinct echoes. The internal cavity of the ear is fitted for reflecting sound in the most perfect manner. It is hollowed out of the hard part of the temporal bone, like a cavern in a rock. In this cavity sounds are repeated and articulated; this repetition of sound excites vibrations in the solid parts of the lamina of the cochlea, which are communicated to the membranous part of the lamina; and this membranous part is an expansion of the auditory nerve,

nerve, which transmits these different vibrations to the mind. As the osses parts are solid and insensible, they can only receive and reflect sounds; the nerves alone are capable of producing sensation. Now, in the organ of hearing, the only nervous part is a portion of the spiral lamina; all the rest is solid; and hence I have made this part the immediate organ of hearing, which may be farther proved by the following reflections.

The external ear is only an accessory to the internal. Its concave windings may augment the quantity of sound; but we can hear very well without the external ears, as appears from dogs and other animals which have had them cut off. The membrane of the tympanum is not more essential to the perception of sound than the external ear; for many persons have heard distinctly after this membrane was either entirely or partly destroyed. Some persons can make the smoke of tobacco, silk cords, lead plates, &c. pass from the mouth to the ear, and yet they hear as well as other men. Neither do the small bones of the ear seem to be essential to hearing. It has frequently happened, that these bones have been carious, and have even come out of the ear, without destroying the sense of hearing. Besides, birds have no such bones; and yet they have most delicate ears. The semicircular canals appear to be more necessary. They are a kind of winding tubes in the os petrosum, that

seem to direct and conduct the sonorous particles to the membranous part of the cochlea, upon which sound acts, and the sensation of it is produced.

Deafness is incident to old age; because the density of the membranous part of the lamina of the cochlea augments in proportion as we advance in years. When this part becomes too solid, the person grows dull of hearing; and when it is entirely ossified, deafness is the consequence; because there is no longer any sensible part of the organ capable to transmit the sensation of sound to the mind. A deafness proceeding from this cause is incurable. But, when it proceeds from a stuffing of the auditory canal with wax, or other viscid matter, it may be removed by syringing, or even by instruments. Whether deafness be occasioned by an external or internal cause, we may easily ascertain, by putting a repeating watch into the person's mouth. If he hears it strike, he may be assured that his deafness is effected by an external cause, and that it, in some measure, admits of a remedy.

I have often remarked, that men who have unmusical ears, and bad voices, hear better with the one ear than with the other. I formerly observed, that squinting was occasioned by an inequality of strength in the eyes: A person who squints sees not so far with the distorted eye as with the other. From this analogy I was led to

to make some experiments on men who sung falsely; and I uniformly found that they heard better with the one ear than with the other. Through each ear they receive a different sensation, which produces a discordance in the total result; and thus, by always hearing false, they necessarily sing false, without perceiving any defect. Persons of this kind are likewise often deceived as to the quarter from which a sound issues. If their best ear be the right one, sounds will more frequently seem to proceed from the right than from the left. I speak here of such persons only as are born with this imperfection; for, though a man advanced in life may, by accident, have one ear duller than another; yet, as he was formerly in the habit of receiving just perceptions of sound, neither his ear nor his voice will be affected by the change.

Trumpets or funnels employed to assist the hearing, answer the same end as convex glasses to old or decayed eyes. The parts necessary to hearing, as well as those necessary to vision, become dense and insensible with age; and, therefore, each of them equally requires the assistance of art to augment the quantity of the medium through which their peculiar sensations are transmitted. Trumpets for facilitating hearing might be rendered as extensively useful to the ear as telescopes are to the eye; but these trumpets could not be employed with advantage, excepting in solitary and silent places; for neighbour-

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ing sounds are uniformly collected and blended with those at a distance, and produce in the ear nothing but a confused noise.

The sense of hearing is of more importance to man than to any other animal. In the latter, it is only a passive quality of receiving impressions from distant objects; but, in man, it is not only a passive quality, but becomes active by the use of speech. It is by this sense that we are enabled to carry on the business of society, and to form a mutual communication of our sentiments. The organs of the voice would be entirely useless, if they were not excited to motion by the sense of hearing. A man deaf from his birth is necessarily dumb, and has no idea of abstract and general knowledge. We must not omit, in this place, a singular account of a man who, for the first time, suddenly acquired the use of hearing, when he was at the age of 24 years. His history, of which the following is an abridgement, is recorded in the Memoirs of the French Academy*.

‘ A young man, of the town of Chartres, aged about 24, who had been deaf from his birth, began, all at once, to speak, to the utter astonishment of all who knew him. He informed his friends, that, for three or four months before, he had heard the sound of bells; and that he was extremely surpris’d at this new and unknown sensation. Some time after,

* Année 1703, p. 18.

after, a kind of humour issued from his left ear, and then he heard distinctly with both. During these three or four months, he listened to every thing; and, without attempting to speak aloud, he accustomed himself to utter softly the words spoken by others. He laboured hard in acquiring the pronounciation of words, and in learning the ideas annexed to them. At length, thinking himself qualified to break silence, he declared that he could speak, though still imperfectly. Soon after, he was interrogated by some able divines concerning his former condition. The principal questions turned upon God, the soul, and moral good and evil. But of these subjects he seemed not to have the smallest conception. Though he was born of Catholic parents, attended mass, was instructed to make the sign of the cross, and to assume all the external marks of devotion, he comprehended nothing of their real intention. He had formed no distinct idea of death; and existed purely in an animal state. Wholly occupied with sensible objects, and with the few ideas he had acquired by the eye, he drew no conclusions from them. He did not want parts; but the understanding of a man, when deprived of the intercourse of society, has so little exercise or cultivation, that he never thinks but when sensible objects obtrude themselves on his mind. The great source of human

'man ideas arises from the reciprocal intercourse of society.'

It is possible, however, to communicate ideas to deaf men, and to give them precise notions of general truths, by writing and by signs. A man deaf from his birth may be taught to read, to write, to communicate even the most complicated ideas, and to understand words by the motions of the lips. Nothing can be a stronger proof of the great resemblance between the different senses, and how far one may supply the place of another.

On this subject, it may not be improper to relate a fact of which I was an eye-witness. M. Rodrigue Pereire, a native of Portugal, having long studied the most effectual methods of teaching the use of language to the deaf and dumb, brought a young man to my house, aged about 19, who had been deaf from his birth. M. Pereire undertook to learn him to speak, read, &c. At the end of four months, the young man could pronounce syllables and words; and, after ten months, he knew, and could pronounce about 1300 words. His education, so happily commenced, was interrupted for nine months, by the absence of his master, who then found that he had forgot a great part of what he had formerly learned. His pronunciation was extremely bad, and most of his words had escaped from his memory. M. Pereire renewed his instructions in the month of February

February 1748, and from that time has never left him, (June 1749). This young man was presented before one of the meetings of the French Academy, where several questions were put to him in writing. His replies, which he made both in writing and in words, were extremely distinct. But his pronunciation was slow, and the tone of his voice was harsh. These defects, however, were unavoidable; for it is by imitation alone that we bring our organs gradually to form precise and well articulated sounds: But a deaf man cannot imitate what he does not hear. The shortness of the time employed by the master, and the surprising progress of the pupil, who was not deficient in ability, fully evince that persons born deaf and dumb may, by the assistance of art, be taught to hold intercourse with society; for I am persuaded, that, if this man had begun to be instructed at the age of seven or eight, he would have attained as many ideas as mankind generally possess*.

S E C T.

* This conjecture is now fully verified by the labours of the ingenious Mr BRAIDWOOD of Edinburgh, who has, for many years, taught, in his academy, great numbers of pupils, who had been born deaf, to speak, to read, to converse by observing the motions of other mens lips, and to understand grammar, morals, religion, and even the most abstract sciences.

S E C T. VII.

Of the Senses in general.

ANIMAL bodies are composed of different substances ; some of which, as the bones, the fat, the blood, the lymph, &c. are insensible ; and others, as the membranes and nerves, seem to be active substances, which give spring and vivacity to all the members. The nerves are the immediate instruments of feeling : Their nature, indeed, is diversified by a difference in their disposition : According to their arrangement, position, and quality, they convey to the mind different species of feeling, which have been distinguished by the name of *sensations*, and which seem, in effect, to have no resemblance to each other. If we consider, however, that all the external senses proceed solely from nervous expansions differently arranged and situated ; that the nerves are the general organ of feeling ; and that no other substance in the animal body is endowed with this faculty ; we shall be inclined to believe, that the senses have one common origin, and that, as all nerves are only various forms of the

the same individual substance, the sensations which result from them differ not so essentially from each other as they at first appear.

The body of the eye is, perhaps, only an expansion of the optic nerve. Its situation is more external than that of any other nerve; and it likewise conveys the most lively and the most delicate sensation. It must, therefore, be affected by the smallest particles of matter, as those of light, and, of course, convey to the mind sensations of all distant bodies which either emit or reflect light. The situation of the ear is more internal than that of the eye; neither is it furnished with so large an expansion of nervous substance, and must, of course, be endowed with a less degree of sensibility, and cannot be affected with particles of matter so minute as those of light. But it is capable of being affected by grosser particles; and it transmits to the mind sensations of such distant bodies as are endowed with the faculty of putting these particles in motion. As these particles are grosser, and have less velocity than those of light, they can only move a short way; and, consequently, the sensations conveyed to us by the ear are much more limited, as to distance, than those afforded by the eye. The membrane which is the seat of smell, is still less supplied with nerves than the ear, and can only give us sensations by the intervention of particles of matter which are grosser and nearer the organ, as those that issue from odorous bodies. These

particles probably consist of the essential oils, which exhale and float in the air, as light bodies swim in water : And, as the nerves are still fewer and more divided on the tongue and palate, odoriferous particles are too weak to affect them. To produce the sensation of *taste*, the oily or saline parts must be detached from other bodies, and applied to the tongue. This sense differs greatly from that of smelling. The latter conveys sensations of bodies at a certain distance ; but the former requires actual contact, and perhaps the solution of particular parts of bodies, as their salts, oils, &c. before any sensation is communicated. Lastly, as the nerves are minutely divided, and thinly spread over the skin, it cannot be affected by the particles of which light, sound, or odors, are composed. Nothing less than contact can give us the ideas which are proper to the sense of touching ; and, of course, it conveys to us no information with regard to distant objects.

Hence the difference between the senses appears to proceed from the situation of the nerves being more or less external, and from the greater or smaller quantity of them bestowed on the different organs. It is for this reason that a nerve, when irritated by a blow, or laid bare by a wound, frequently gives us the sensation of light without the intervention of the eye ; and, from the same cause, we often feel the sensation of

of sound, when the ear is not affected by any thing from without.

When the particles of light or of sound are collected in great quantities, they form a kind of solid mass, and produce sensations of different species, which seem to have no analogy with the original sensations: A very great assemblage of luminous particles affect not only the eyes, but the nerves of the skin, in which they excite the sensation of heat, which is a feeling different from that of vision, though it be produced by the same cause. Heat, therefore, is a sensation proceeding from contact with light, which acts as a solid body, or as a mass of matter in motion. This action of light, like other bodies in motion, is apparent when light substances are exposed to the focus of a burning glass: Before they are heated, the action of the light communicates to them a motion, by which they are driven from their former station. Here heat acts like solid bodies upon each other, since it is capable of displacing light substances, and of communicating to them a motion by actual impulse.

In the same manner, when the particles of sound are collected in great quantities, they produce a sensible agitation in the body, which is very different from the action of sound on the ear. A violent explosion, or a clap of thunder, produces a succussion in us, and in every neighbouring body. Here sound likewise acts as a solid

solid body. This tremulous motion is not occasioned by the agitation of the air; for, we perceive not that it is accompanied with wind; and, besides, even the strongest wind does not produce such violent concussions. It is owing to this action of the sonorous particles, that the vibrations excited in one string are communicated to the others; and the tremulous sensation we feel from a violent noise is very different from the sensation of sound in the ear, though it be an effect of the same cause.

All the varieties in our sensations proceed from the greater or lesser quantity of nerves, and from their position being more or less external. This is the reason why some of the senses, as the eye, the ear, the nose, are affected by the minute particles which issue from particular substances; and why others, as the senses of tasting and touching, require actual contact, or emanations of the grossest kind, by the latter of which we receive the sensations of the solidity, or fluidity, and of the heat of bodies.

A fluid differs from a solid, because its particles have no coherence, or are not gross enough to admit of being laid hold of on different sides at the same time. The particles of fluids touch one another but in one, or so few points, that none of them can have any great degree of adhesion with another. Solid bodies, even when reduced to an impalpable powder, do not absolutely lose their solidity; because their particles,
by

by touching each other in many points, still preserve a degree of cohesion; and this is the reason why we can squeeze them together, and form them into large tangible masses.

The sense of feeling extends over the whole body; but its exertions are different in different parts. The sensation of touching is excited by the application of foreign bodies to some part of our own body. If a foreign body be applied to the breast or shoulders, we feel it; but we have no idea of its figure, because the breast or shoulder touches the foreign body on one side only. The same remark is applicable to other parts which are incapable of folding round, or embracing at one time, several sides of foreign bodies. The idea of figure can only be acquired by the flexible parts of the body, as the hands, which, from their structure, are enabled to feel different parts of surfaces at the same time.

The hand is not the principal organ of touch, because the extremities of the fingers are furnished with a great quantity of nervous papillae, but because it is divided into several parts, which are all flexible, all act at the same time, and are all obedient to the will. This alone is the source of all our ideas of figure and of magnitude. The surface of the hand and fingers is greater, in proportion, than any other part of the body, because no other part is so much divided. This advantage, when joined to the flexibility of the fingers, renders the hand the most perfect instrument

ment for conveying ideas of the figures of bodies. If the hand were divided into 20 or more fingers, these ideas would be still more precise and exact; if, on the contrary, their present number were diminished, or if the hand were totally deprived of fingers, our ideas of figure would be very confused and indetermined.

Those animals which are furnished with hands appear to have most sagacity. Apes imitate the mechanical actions of man so completely, that they seem to be excited by the same sensations. But all animals which are deprived of hands can have no distinct idea of the figure or magnitude of objects; because none of their parts are sufficiently flexible and divided, to enable them to twist round the surfaces of bodies. This is the reason why animals are often terrified at objects which ought to be familiar to them. The muzzle is their principal organ of feeling, because it is divided into two parts by the mouth, and because the tongue serves both for touching bodies, and for turning them over, which they often do, before they seize them with their teeth. It is likewise probable, that animals which are furnished with many instruments of feeling, as the cuttle-fish, the polypus, and other insects, have a superior faculty of distinguishing and of choosing what is agreeable or convenient for them. Hence fishes, whose bodies are covered with scales, ought to be the most stupid of animals, because they can have no knowledge of
the

the form of objects; and a very obtuse sense of feeling must be conveyed through the scales. Hence also, all animals which have not divided extremities, as arms, legs, paws, &c. must have a more obtuse sense of feeling than those that are furnished with these instruments of sensation. Serpents, however, are less stupid than fishes; because, though their skin is hard and scaly, they have the faculty of twisting round bodies, and of obtaining, by this means, more accurate conceptions of their forms and qualities.

Thus the two chief obstacles to the exercise of the sense of feeling proceed, first, from the uniformity of the bodies of animals, or from their want of flexible and divided extremities; and, secondly, from the materials which cover the skin, as hair, feathers, scales, shells, &c. The harder and more solid this covering is, the sense of feeling will be the less acute, and the finer and more delicate the skin, the sensation of feeling will be the more lively and exquisite. Women, among other advantages over the men, have a finer skin, and a more delicate perception of feeling.

The skin of a foetus, while in the womb of the mother, is extremely delicate. It ought; therefore, to have a lively sense of external impressions. But, as it swims in a liquor, and as fluids blunt the action of every shock from without, the foetus is rarely hurt, and never without some violent shock be received by the mother.

Thus

Thus the sense of feeling, though it depends on the fineness of the skin, and is extended over the whole body, can have little exercise in the foetus-state : A foetus, therefore, though it may touch different parts of its own body with its hands, can have no distinct sensations arising from the sense of feeling.

To a new-born infant, the hands are equally useless as they are to a foetus ; because, by the absurd practice of swaddling, they are not allowed to employ them for six or seven weeks after birth. The improvement of the sense of feeling, from which we derive all our knowledge, is by this means unquestionably retarded. If a child had the free use of its hands the moment it came into the world, it would sooner acquire ideas of the figure and magnitude of objects : And who can determine the influence which our first ideas have upon those that are afterwards acquired ? One man, perhaps, excels another in genius and ability, only because he has been permitted, at a more early period, to make an unrestrained use of the sense of feeling. Infants, as soon as they are allowed to employ their hands, endeavour to touch every object they see. They delight in handling every thing they can seize : By feeling every part of bodies, they seem to be desirous of acquiring exact ideas of their form. It is in this manner they amuse, or rather instruct, themselves with new objects : And this passion for novelty continues to be our amusement during life.

It

It is by the sense of feeling alone that we acquire real knowledge. The innumerable errors into which we are led by the illusions of the other senses are corrected by feeling. But how is this important sense originally unfolded? How do primary ideas arrive at the mind? Have we forgot every trace of what passes in the darkness of infancy? How shall we recall the first impressions of thought? Do not inquiries of this nature imply presumption and temerity? If the subject were less momentous, we might be liable to censure. But the mind cannot, perhaps, be occupied with a subject more worthy of research; and every effort ought to be exerted in the contemplation of great objects.

Let us suppose, then, a man in the same situation with him who first received existence, a man whose organs were perfectly formed, but who was equally new to himself and to every external object which surrounded him: What would be this man's first sensations, and his first judgments concerning himself, and the objects of his sensations? Were he to give a history of his thoughts, and of the manner in which he received impressions, What information would he convey? To give perspicuity to facts, I shall attempt to make him speak for himself; and this short philosophical detail may not, perhaps, be an useless digression.

I remember the moment when my existence commenced: It was a moment replete with joy, amazement, and anxiety. I neither knew what I was, where I was, nor from whence I came. I opened my eyes; what an increase of sensation! The light, the celestial vault, the verdure of the earth, the transparency of the waters, gave animation to my spirits, and conveyed pleasures which exceed the powers of expression.

I at first believed that all these objects existed within me, and formed a part of myself. When totally absorbed in this idea, I turned my eyes to the Sun: His splendour overpowered me. I involuntarily shut out the light, and felt a slight degree of pain. During this moment of darkness, I imagined that I had lost the greatest part of my being.

When reflecting, with grief and astonishment, upon this great change, I was roused with a variety of sounds. The singing of birds, and the murmuring of the breezes, formed a concert, which excited the most sweet and enchanting emotions. I listened long, and was convinced that these harmonious sounds existed within me.

Totally occupied with this new species of existence, I had already forgot the light, though the first part of my being that I had recognized. I again, by accident, opened my eyes, and was delighted

delighted to find myself recover the possession of so many brilliant objects. This pleasure surpassed every former sensation, and suspended, for a time, the charming melody of sound.

I fixed my eyes on a thousand objects: I soon perceived that I had the power of losing and of recovering them, and that I could, at pleasure, destroy and renew this beautiful part of my existence.

I could now see without astonishment, and hear without anxiety, when a gentle breeze wafted perfumes to my nostrils. This new, and delightful sensation, agitated my frame, and gave a fresh addition to my self-love.

Totally occupied by all these sensations, and loaded with pleasures so delicate and so extensive, I suddenly arose, and was transported by the perception of an unknown power.

I had made but a single step, when the novelty of my situation rendered me immoveable. My surprise was extreme. I thought my being fled from me: The movement I had made confounded the objects of vision; and the whole creation seemed to be disordered.

I raised my hand to my head; I touched my forehead and my eyes; and I felt every part of my body. The hand now appeared to be the principal organ of my existence. The perceptions afforded by this instrument were so distinct and so perfect; the pleasures conveyed by it were so superior to those of light and sound, that,

that, for some time, I attached myself entirely to this substantial part of my being, and I perceived that my ideas began to assume a confidence and a reality which I had never before experienced. Every part of my body, which I touched with my hand, reflected the sensation, and produced in my mind a double idea.

By this exercise I soon learned, that the faculty of feeling was expanded over every part of my frame; and I began to recognise the limits of my existence, which till now seemed to be of an immense extent.

I surveyed my body, and I judged it to be of a size so immense, that all other objects, in comparison, seemed to be only luminous points. I followed my hand with my eyes, and observed all its motions. Of all these objects my ideas were confused and fallacious. I imagined that the motion of my hand was a kind of fugitive existence, a mere succession of similar causes; I brought my hand near my eye; it then seemed to be larger than my whole body; for it concealed from my view almost every other object.

I began to suspect that there was some illusion in the sensation conveyed by the eyes. I distinctly perceived my hand was only a small part of my body; but I was unable to comprehend how it should appear so enormously large. I therefore resolved to depend for information upon the sense of feeling alone, which had never deceived

deceived me, and to be on my guard against all the other modes of sensation.

This precaution was extremely useful to me. I renewed my motions, and walked with my face turned toward the heavens. I struck against a palm tree, and felt a slight degree of pain. Seized with terror, I ventured to lay my hand upon the object, and discovered it to be a being distinct from myself, because it gave me not, like touching my own body, a double sensation: I turned from it with horror, and perceived, for the first time, that there was something external, something which did not constitute a part of my own existence.

It was with difficulty that I could reconcile myself to this discovery; but, after reflecting on the event which had happened, I concluded that I ought to judge concerning external objects in the same manner as I had judged concerning the parts of my body; and the sense of feeling alone could ascertain their existence. I resolved, therefore, to feel every object that I saw. I had a desire of touching the Sun; I accordingly stretched forth my hands to embrace the heavens; but they met, without feeling any intermediate object.

Every experiment I made served only to increase my astonishment; for all objects appeared to be equally near; and it was not till after an infinite number of trials, that I learned to use my eye as a guide to my hand. As the
hand

hand gave me ideas totally different from the impressions I received by the eye, my sensations were contradictory; the judgments I formed were imperfect; and my whole existence was disorder and confusion.

Reflecting deeply on the nature of my being, the contradictions I had experienced filled me with humility: The more I meditated, my doubts and difficulties increased. Fatigued with so many uncertainties, and with anxious emotions which successively arose in my mind, my knees bended, and I soon found myself in a situation of repose. This state of tranquility added fresh force to my senses. I was seated under the shade of a beautiful tree. Fruit of a vermilion hue hung down, in the form of grapes, within reach of my hand. These fruits I gently touched, and they instantly separated from the branch. In laying hold of one of them, I imagined I had made a great conquest; and I rejoiced in the faculty of containing in my hand an entire being which made no part of myself. Its weight, though trifling, seemed to be an animated resistance, which I had a pleasure in being able to conquer.

I held the fruit near my eye: I examined its form and its colours. A delicious odor allured me to bring it near my lips, and I inhaled long draughts of its perfumes. When entirely occupied with the sweetness of its fragrance, my mouth opened, and I discovered that I had an
internal

internal sense of smelling, which was more delicate and refined than that conveyed by the nostrils. In fine, I tasted the fruit. The novelty of the sensation, and the exquisiteness of the flavour, filled me with astonishment and transport. Till now I had only enjoyed pleasures; but taste gave me an idea of voluptuousness. The enjoyment was so congenial and intimate, that it conveyed to me the notion of possession or property. I thought that the substance of the fruit had become part of my own, and that I was endowed with the power of transforming bodies.

Charmed with this idea of power, and with the pleasures I felt, I continued to pull and to eat. But an agreeable languor gradually impaired my senses; my limbs grew heavy; and my mind seemed to lose its natural activity. I perceived this inaction by the feebleness of my thoughts: The dullness of my sensations rounded all external objects, and conveyed only weak and ill-defined ideas. At this instant my eyes shut, and my head reclined upon the grass.

Every thing now disappeared: Darkness and confusion reigned. The train of my ideas was interrupted; and I lost the consciousness of my existence. My sleep was profound; but, having no mode of measuring time, I knew nothing of its duration. My awakening appeared to be a second birth; for I only perceived that I had ceased to exist. This temporary annihilation

lation gave me the idea of fear, and made me conclude that my existence was not permanent.

Another perplexity arose: I suspected that sleep had robbed me of some part of my powers: I tried my different senses, and endeavoured to recognise all my former faculties. When surveying my body, in order to ascertain its identity, I was astonished to find at my side another form perfectly similar to my own! I conceived it to be another *self*; and, instead of losing by sleep, I imagined myself to be doubled.

I ventured to lay my hand upon this new being: With rapture and astonishment I perceived that it was not myself, but something much more glorious and desirable; and I imagined that my existence was about to dissolve, and to be wholly transfused into this second part of my being.

I perceived her to be animated by the touch of my hand: I saw her catch the expression in my eyes; and the lustre and vivacity of her own made a new source of life thrill in my veins. I ardently wished to transfer my whole being to her; and this wish compleated my existence; for now I discovered a sixth sense.

At this instant the Sun had finished his course; I perceived, with pain, that I lost the sense of seeing; and the present obscurity recalled in vain the idea of my former sleep.

S E C T. IX.

Of the Varieties of the Human Species.

WHAT we have hitherto remarked concerning the generation of man and the structure of his body, constitutes only the history of the individual: That of the species requires a separate detail, the principal facts of which must be collected from the varieties that appear among men in different regions of the earth. These varieties may be reduced to three heads: 1. The colour; 2. The figure and stature; and 3. The dispositions of different people. Each of these heads, if extensively considered, might afford materials for a volume; but we shall confine ourselves to those which are most general and best ascertained.

With this view, we shall survey the surface of the earth, commencing with the northern regions. In Lapland, and on the northern coasts of Tartary, we find a race of men of an uncouth figure, and small stature. Their countenances are equally savage as their manners. These men, who appear to be a degenerated species, are very nume-

rous, and occupy vast regions. The Danish, Swedish, and Muscovite Laplanders, the inhabitants of Nova Zembla, the Borandians, the Samoiedes, the northern Tartars, the Ostiacks of the Old Continent, and the Greenlanders and savages to the north of the Esquimaux Indians in the New Continent, appear to be all the same race, who have extended and multiplied along the coasts of the north sea, in deserts, and under climates which could not be inhabited by other nations. All these people have broad large faces *, and flat noses. Their eyes are of a yellowish brown colour, inclining to black †; their eye-lids extend towards the temples ‡; their cheek-bones are very prominent; their mouths are large, and their lips thick and reflected; the under part of their face is narrow; they have a squeaking voice; the head is large, the hair black and smooth; and the skin of a tawny or swarthy hue. Their size is diminutive; but, though meagre, their form is squat. Most of them are only four feet high; and their tallest men exceed not four feet and a half. This race is so different from all others, that it seems to constitute a distinct species; for, if there be among them any distinction, it arises only from a greater

* See le Voyage de Regnard, tom. 1. p. 169.; Il Genio vagante del Conte Aurelio degli Anzi; et les Voyages du Nord faits par les Hollandois.

† See Linnaei Fauna Suecica, 1746. p. 1.

‡ See La Martiniere, p. 39.

er or less degree of deformity. The Borandians, for example, are still less than the Laplanders. The iris of their eyes is of the same colour; but the white is of a reddish yellow: Their skin is more tawny; and their legs, instead of being slender, like those of the Laplanders, are very thick, and shapeless. The Samoiedes are more squat than the Laplanders; their heads are larger; their noses are broader, and their complexion darker; their legs are shorter; their hair is longer, and their beards are more scanty. The skin of the Greenlander is more tawny than that of the other nations, being of a deep olive colour; and, it is said, that some of them are as black as the Ethiopian. Among all these people, the women are fully as ugly as the men, and resemble them so much, that the distinction is not easily perceived. The women of Greenland are very short; but their bodies are well proportioned. Their hair is blacker, and their skin softer than those of the Samoiede females. Their breasts are so long and pliable, that they can suckle their children over their shoulders. Their nipples are black as jet, and their skin is of a very deep olive colour. Some travellers alledge that these women have no hair but upon their heads, and that they are not subject to the menstrual evacuation. Their visage is large; their eyes small, but black and lively; and their feet and hands are short. In every other respect, they resemble the Samoiede females.

females. The savages north of the Esquimaux, and even in the northern parts of the island of Newfoundland, have a great resemblance to the Greenlanders. Like them, their stature is small, their faces broad, and their noses flat; but their eyes are larger than those of the Laplander.

These people not only resemble each other in deformity, in smallness of stature, and in the colour of their eyes and hair, but also in their dispositions and manners: They are all equally gross, superstitious, and stupid. The Danish Laplanders have a large black cat, to which they communicate their secrets, and consult in all their important affairs; such as, whether this day should be employed in hunting or fishing. Among the Swedish Laplanders, a drum is kept in every family for the purpose of consulting the devil; and, though they are a robust and nimble people, such is their pusillanimity, that they never could be persuaded to face a field of battle. Gustaphus Adolphus endeavoured to embody a regiment of Laplanders; but he was obliged to relinquish the project. They cannot, it would appear, exist but in their own country, and in their own manner. To enable them to travel on the snow, they use skates made of fir-wood, about two ells long, and half a foot broad. These skates are raised before, with a hole in the middle for tying them firm on the foot. With these they run on the snow with such rapidity, that they easily overtake the swiftest

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swiftest animals. They carry with them a pole pointed with iron at one end, and rounded at the other. This pole serves to push them along, to direct their course, to preserve them from falling, to stop their impetuosity, and to kill the animals they overtake. With these skates they descend the most frightful precipices, and climb the steepest and most rugged mountains. The skates used by the Samoiedes are shorter, seldom exceeding two feet in length. Among all these people, the women use skates as well the men. They likewise employ the bow and the cross-bow; and, it is said, that the Muscovite Laplanders dart a javelin with so much force and dexterity, that, at the distance of 30 paces, they are certain of hitting a mark not larger than a crown-piece; and that, at the same distance, they will transfix a human body. They hunt the ermine, the lynx, the fox, and the martin, and barter their skins for brandy and tobacco. Their food consists principally of dried fish, and of the flesh of the rein-deer and bear. Their bread is composed of the pounded bones of fishes, mixed with the tender bark of the pine, or birch tree. Most of them make no use of salt. Their usual drink is whale-oil, or water in which juniper berries have been infused. They seem to have no idea of religion, or of a Supreme Being. They are mostly idolaters, and exceedingly superstitious. More gross than savages, they have neither courage, dignity, nor a sense of shame,

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The manners of these abject people serve only to render them despicable. They bathe naked, and promiscuously, boys and girls, mothers and sons, brothers and sisters, without feeling the smallest sense of impropriety. When they come out of the baths, which are extremely warm, they immediately plunge themselves into cold rivers. They offer their wives and daughters to strangers, and esteem it the highest affront if the offer be rejected. This custom is universal among the Samoiedes, the Borandians, the Laplanders, and the inhabitants of Greenland. In winter, the Laplanders clothe themselves with the skin of the rein-deer, and, in summer, with the skins of birds. The use of linen is unknown to them. The women of Nova Zembla pierce their noses and their ears, and ornament them with pendants of blue stone; and, to increase their charms, they draw blue streaks across their forehead and chin. Their husbands cut their beards into a round form, and wear no hair on the head. The Greenland women clothe themselves with the skin of the dog-fish. They likewise paint their faces blue and yellow, and wear pendants in their ears. They all live under ground, or in huts almost sunk below the surface, and covered with the bark of trees, or bones of fishes. It is a common practice with them, during winter, to make subterraneous communications from hut to hut, by which they can visit their neighbours without going abroad.

A

A night, consisting of several months, obliges them to illuminate their dreary abodes with lamps, in which they burn the same whale-oil that serves them for drink. In summer they have hardly more ease than in winter; for they are obliged to live perpetually in a thick smoke. This is the only means they have hitherto contrived to guard themselves against the bite of the gnats, which are, perhaps, more numerous in this frozen country than in the Torrid Zone. Notwithstanding this melancholy and hard mode of living, they are seldom or never sick, and all arrive at extreme old age. Even the old men are so vigorous, that it is difficult to distinguish them from the young. Blindness, which is very frequent among them, is the only malady to which they are subject. As their eyes are perpetually dazzled with the reflection from the snow in winter, autumn, and spring, and involved in smoke during summer, few of them retain their sight after they are advanced in years.

It is therefore apparent, that the Samoiedes, the Zemblians, the Borandians, the Laplanders, the Greenlanders, and the savages to the north of the Esquimaux, are the same race of men; because they resemble one another in figure, in stature, in colour, in manners, and even in singularity of customs. - The custom of offering their wives and daughters to strangers, and of being vain when the offer is accepted, may proceed

ceed from a sense of their own deformity, as well as that of their females, whom they are apt to think the more handsome, because they are not despised by strangers. At any rate, it is certain, that this practice is general among all these nations, though very distant from each other, and though separated by a great sea. We meet with it among the Crim Tartars, the Calmucs, and several other nations in Siberia and Tartary, who are almost equally ugly as the inhabitants of the more northern regions. In all the neighbouring nations, on the contrary, as China and Persia *, where the women are beautiful, the men are remarkable for their jealousy.

In examining the different nations adjacent to that vast tract of land occupied by the Laplanders, we find no relation between them and the race last mentioned. The Ostiacks and Tongusians, who border on the Samoiedes on the south and south-east, are the only people who have any resemblance to them. The Samoiedes and Borandians have no similarity to the Russians. The Laplanders resemble not, in any manner, the Fins, the Goths, the Danes, or the Norwegians. The Greenlanders are totally different from the savages of Canada, who are large and

* La Boulai informs us, that, after the death of the wives of the Schachs, they conceal the place where they are interred; and that the antient Egyptians would not embalm their wives till four or five days after their death, to prevent the surgeons from having any temptation; Voyage de la Boulaie, p. 110.

and well made; and, though the tribes differ from one another, yet none of them have any analogy to the Laplanders. The Ostiacks, however, seem to be a less ugly, and a taller branch of the Samoiedes *. They feed upon raw flesh or fish; they eat all kinds of animals without distinction; they prefer blood to water for their drink; like the Laplanders and Samoiedes, they are mostly idolaters; in a word, they appear to be the line which divides the Lapponian and Tartarian races; or, rather, the Laplanders, the Samoiedes, the Borandians, the Nova Zemblians, and perhaps the Greenlanders, and the Dwarfs of North America, may be considered as Tartars reduced to the lowest degree of degeneracy. The Tongusians seem to be less degenerated than the Ostiacks; because the former, though sufficiently ugly, are taller and better proportioned. The Samoiedes and Laplanders lie under the 68th or 69th degree of latitude, but the Ostiacks under the 60th. The Tartars, who are situated along the Wolga, in the latitude of 55, are gross, stupid, and brutal. Like the Tongusians, they have no idea of religion; and they will not marry girls till they have had intercourse with other men.

The Tartars occupy immense regions in Asia. They spread over that vast tract of country extending from Russia to Kamschatka, a space of

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* See le Voyage de Evertsfbrand, p. 212, &c. and les Nouveaux Memoires sur l'etat de la Russie, tome 1. p. 270. &c.

11 or 12 hundred leagues in length, by more than 750 in breadth, which is a territory more than 20 times larger than the kingdom of France. The Tartars border with China, the kingdoms of Boutan, and of Alva, and the Mogul and Persian empires, as far as the Caspian Sea, on the north and west. They spread along the Wolga and the west coast of the Caspian, as far as Daghestan; they have penetrated to the north coast of the Black Sea, and have establishments in Crimea, in Little Tartary near Moldavia, and in the Ukraine. All these people, even in their youth, have large wrinkled foreheads; their noses are thick and short, and their eyes small and sunk*; their cheek-bones are very high, and the lower part of their face is very narrow; their chin is long and prominent, and the upper jaw falls in; the teeth are long and distinct from each other; the eye-brows are thick, and cover the eyes; the face is flat; the skin is tawny or olive; and the hair is black. Their bodies are of a middle stature, but strong and robust. They have but little beard, and the hairs are disposed in tufts, like the beards of the Chinese. Their thighs are thick, and their legs short. The Calmuck Tartars are the most ugly; there is even something frightful in their countenance. They are all wandering vagabonds, living in tents made of cloth or of skins. They eat the
flesh

* See les Voyages de Rubrusquis, de Marc Paulc, de Jean Struys, du Pere Avril, &c.

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flesh of horses, and of other animals, either raw, or a little softened by putrifying under their saddles, and likewise fishes dried with the sun. Their common drink is mares milk fermented with the flour of miller. They all shave the head, excepting a little tuft which they allow to grow, in order to form two tresses, one of them to hang on each side of the face. The women, who are as ugly as the men, wear their hair, in which they fix little pieces of copper, and other ornaments of the same nature.

Among most of these tribes, no marks of religion, or of decency in their manners, are to be found. They are all robbers; and the Tartars of Daghestan, who border on civilized nations, have a great trade in slaves, whom they carry off by force, and then sell them to the Turks and Persians. Their wealth consists chiefly of horses, which are, perhaps, more numerous in Tartary than in any other country on the globe. These people live perpetually with their horses, and are continually occupied in training, dressing, and exercising them. They manage them with such address, that a stranger would imagine both creatures to be animated with the same mind. These horses not only obey the gentlest motions of the bridle, but they seem to know the very intention of their riders.

To learn the particular differences which subsist among the race of Tartars, we have only to compare the descriptions given by travellers of
their

their different tribes. We are informed by Tavernier, that the Calmucks, who live in the neighbourhood of the Caspian Sea, between Muscovy and Great Tartary, are robust men, but the most ugly and deformed beings under Heaven. Their faces are so large and so flat, that their eyes, which are generally small, are situated five or six inches asunder. Their noses are so low, that, instead of nostrils, two holes are only to be seen; and their knees bend outward, and their legs inward. After the Calmucks, the Tartars of Daghestan hold the next rank in deformity. The Little Tartars, or those of Nogai, who live near the Black Sea, are not so ugly as the Calmucks, though they have flat faces, and small eyes, and resemble the Calmucks in their general figure. By their intercourse with the Circassians, the Moldavians, and other adjoining nations, this race of Tartars have perhaps lost a part of their original deformity. The Tartars of Siberia, though, like the Calmucks, they have broad faces, short flat noses, and small eyes, and though their language be very different, there is still so great a similarity between them, that they ought to be regarded as the same race of people. The Tartars of Bratski are considered by Père Avril as of the same race with the Calmucks; and, in proportion as we advance eastward, and approach Independent Tartary, the features of the Tartars gradually soften; but the characters essential to their race are never obliterated. Lastly, the Mongou-

Mongou-Tartars, who conquered China, and were the most polished, though their features be less disagreeable, yet, like all the other tribes, they have small eyes, large flat faces, thin black or red beards †, short sunk noses, and a tawny complexion. The people of Thibet, and of the other southern provinces of Tartary, are also less deformed. Mr Sanchez, first physician to the Russian army, a man of great learning and ability, has obliged me with the following remarks made by him in travelling through Tartary.

In the years 1735, 36, and 37, he visited the Ukraine, the banks of the Don as far as the sea of Zabach, and the confines of Cuban as far as Asoph. He traversed the deserts which lie between the country of the Crims and Backmut. He journeyed among the wandering Calmucks from the kingdom of Casan to the banks of the Don, among the Tartars of Crimea and Nogai, who wander between the Crimea and the Ukraine, and likewise among the Tartars of Kergissi and Tcheremissi, who are situated to the North of Astracan, from the 50th to the 60th degree of latitude. He remarked, that the Tartars of Crimea and of the province of Cuban, were of a middle stature; and that they had broad shoulders, narrow flanks, strong nervous limbs, black eyes, and a tawny complexion. The Tartars of Kergissi and Tcheremissi are smaller and more squat; they are grosser, and less agile; they

† Palafox, p. 444.

they have black eyes, a tawny hue, and faces still broader than the former. He observed, among these Tartars, several men and women who had no resemblance to them, and of whom some were as white as the inhabitants of Poland. As these nations abound with slaves, both male and female, who are carried off from Russia and Poland; as their religion permits a plurality of wives and concubines; and as their Sultans, Murzas, or Nobles, bring their wives from Circassia and Georgia, the children who spring from such alliances are less deformed, and whiter than those of the unmixed natives. There are even among the Tartars a whole nation, that of the Kabardinski, who are remarkably beautiful. M. Sanchez saw no less than 300 of those men in the Russian service; and he assures us, that he never saw men make a more handsome figure. Their countenances were as fresh and white as any in Europe; they had large black eyes; and they were tall and well proportioned. He adds, that the Lieutenant General of Serapikin, who had lived long in Kabarda, informed him, that the women were equally beautiful. But this nation, so totally different from the other Tartar tribes with which they are surrounded, continued M. Sanchez, are said to have come originally from the Ukraine, and had been transported into Kabarda about 150 years ago.

The blood of the Tartars is mixed on one side with the Chinese, and, on the other, with the oriental

oriental Russians. But the characteristic features of the race are not entirely obliterated by this mixture; for, among the Muscovites, the Tartarian aspect is very frequent; and, though the former have sprung from the common European race, we still find many individuals with squat bodies, thick thighs, and short legs, like the Tartars. But the Chinese have so great a resemblance to the Tartars, that it is uncertain whether they be not of the very same race: The most remarkable difference arises from a total disparity in their dispositions, manners, and customs. The Tartars are fierce, warlike, and fond of hunting. They love fatigue and independence; and they are hardy and brutally gross. But the manners of the Chinese are the very reverse. They are effeminate, peaceable, indolent, superstitious, submissive, ceremonious, and parasitical. In their features and form, however, they have a great resemblance to the Tartars.

The Chinese, says Hugon, are large and fat men, with well-proportioned limbs, round broad faces, small eyes, large eye-brows, high eye-lids, and small sunk noses. They have only seven or eight tufts of hair on each lip, and very little on the chin. Those who live in the southern provinces are browner and more tawny than those in the northern parts; and their colour resembles that of the people of Mauritania, or the more swarthy of the Spaniards: But, in the
middle

middle provinces, they are as white as the Germans. According to Dampier, and others, they are not all large and fat, though they regard these properties as great ornaments to the human figure. Speaking of the inhabitants of the island of St John, on the coast of China, Dampier informs us, that they are tall, erect, and not incumbered with fat; that they have a long visage and a high forehead; that their eyes are small, their nose pretty large and elevated in the middle, their mouth of a moderate size, their lips thin, their complexion ash-coloured, and their hair black; that they have naturally little beard; and that they pull out all the hairs, except a few on the chin and upper lip. According to Gentil, the Chinese have nothing disagreeable in their aspect, especially in the northern provinces: Those whom necessity exposes to the sun, in the southern provinces, are tawny. In general, they have small oval eyes, short noses, and thick bodies of a middle stature. He assures us, that the women use every art to diminish their eyes; and that the young girls, instructed by their mothers, continually extend their eye-lids, in order to make their eyes small and oblong, which, when joined to a flat nose, and large, open, pendulous ears, constitute a perfect beauty. He adds, that their complexion is fine, their lips of a beautiful red, their mouths well-shaped, and their hair exceedingly black; but that the chewing of betle blackens their teeth, and their constant

stant use of paint, so greatly injures their skin, that they have the appearance of old age before they arrive at 30 years.

We are assured by Palafox, that the Chinese are whiter than the oriental Tartars; that they have also less beard; but that, in every other respect, there is little difference in the visages of these two nations. It is very uncommon, he says, to see blue eyes either in China or the Philippine Islands, excepting the Europeans, or those born of European parents.

It is alledged by Innigo Biervillas, that the women of China are better made than the men. The faces of the latter, he observes, are large, and their complexions yellowish; their noses are broad and compressed; and their bodies are thick and coarse like those of Dutchmen: The women, on the contrary, are exceedingly handsome; their skin and complexion are admirably fine; and their eyes are extremely beautiful: But few of them, he adds, have good noses, because they are purposely compressed in their infancy.

Most of the Dutch voyagers agree that the Chinese, in general, have broad faces, small eyes, flat noses, and hardly any beard; that the natives of Canton, and all along the southern coast, are as tawny as the inhabitants of Fez in Africa; but that those of the interior provinces are mostly white. Now, if we compare the descriptions of the Tartars and Chinese given by the diffe-

rent authors above quoted, we cannot hesitate in pronouncing, that the Chinese, though they differ a little in their stature and in the form of their countenance, have a greater relation to the Tartars than to any other people, and that all the differences between them proceed entirely from climate and the mixture of races. This is the opinion of Chardin: 'The size of the Little Tartars,' he remarks, 'is about four inches less than that of the Europeans; and they are thicker in the same proportion. Their complexion is copper-coloured; their faces are broad, flat, and square; their noses are compressed, and their eyes small. Now, these are the exact features of the Chinese; for, after the most minute examination, during my travels, I found, that all the people, to the east and north of the Caspian Sea, and to the east of the Peninsula of Malacca, have the same configuration of face, and nearly the same stature. From this circumstance, I was induced to think, that all these people, notwithstanding the varieties in their manners and complexion, sprung from the same source; for differences in colour proceed entirely from climate and the manner of living; and varieties in manners originate from the soil, and from the degrees of opulence enjoyed by different nations *.'

Father

* See Chardin, tom. 3. p. 86.

Father Parennin, who lived long in China, and accurately observed the manners of that people, informs us, that the neighbouring nations on the west, from Thibet northward to Chamo, differed from the Chinese in manners, language, features, and external conformation; that they are a rude, ignorant, slothful people, faults very uncommon among the inhabitants of China; that, when any of these Tartars come to Pekin, and the Chinese are asked the reason of these differences, they answer, that they are occasioned by the water and the soil; or, in other words, that the nature of the country produces these changes in the bodies and dispositions of its inhabitants. He adds, that this remark seems to be more verified in China than in any other country he ever saw; and that, when following the Emperor in a journey to Tartary, as far as the 48th degree of north latitude, he found Chinese families from Nankin, who had settled there, whose children had become perfect Mongous, having their heads sunk between their shoulders, crooked legs, and an aspect that was truly gross and disgusting*.

The Japanese are so very similar to the Chinese, that they may be regarded as the same race of men; their colour is indeed darker, because they live in a more southern climate. In general, their complexion is vigorous; their stature short; their face and nose broad and flat; their

* See Recueil 24. des Lettres edifiantes.

eyes small; their beard thin; and their hair black. They are haughty, warlike, full of vigour and dexterity, civil and obliging, smooth-tongued, and abound in compliments; but they are a vain and inconstant people. They sustain, with incredible patience, hunger, thirst, cold, heat, fatigue, and all the other hardships of life. Like the Chinese, they eat their meat with small sticks, and, during their meals, they use a multitude of ceremonies and strange grimaces. They are laborious, skilful artificers; and, in a word, their dispositions, manners, and customs are nearly the same with those of the Chinese.

The absurd custom of rendering the feet of their women so small that they can hardly support their bodies, is common to both nations. Some travellers affirm, that, when the Chinese girls arrive at three years of age, their feet are bended in such a manner, that the toes lie under the sole; that they apply aquafortis to burn off the flesh; and then wrap them up in strong bandages. They add, that the women feel the consequences of this operation all their lives; for they walk with much difficulty, and their gait is exceedingly ungraceful. They cheerfully submit, however, to this inconveniency; and, as it is a mean of pleasing, they endeavour to make their feet as small as possible. Other travellers deny that they break the feet, and alledge, that they only compress them so forcibly as to prevent their growth: But all agree, that every

every woman of fashion, and every woman that is reckoned handsome, must have her feet so small that they could enter with ease into the shoe of a child of six years of age.

We may, therefore, upon the whole, conclude, that the Japanese and Chinese are the same race of men; that their civilization is of a very ancient date; and that they differ more from the Tartars in their manners than in their figure. Their early civilization may be ascribed to the fertility of the soil, the mildness of the climate, and the vicinity of the sea; while the Tartars, removed from the sea, and separated from the southern nations by high mountains, have continued to wander in their vast deserts, and under a climate, the rigour of which, especially in the northern parts of Tartary, could only be supported by a robust and uncultivated people. The country of Jesso, which lies to the north of Japan, though situated under a climate which ought to be temperate, is, however, cold, barren, and mountainous. Its inhabitants are also totally different from those of China and Japan. They are a gross brutal race, having neither manners nor arts. Their bodies are thick and short; their hair is long and bristly; their eyes are black; their forehead is flat, and their colour yellow, though less so than that of the Japanese. Their faces, as well as their whole body, are very hairy. They live like savages, and their food consists of the fat and oil of whales, and other

other fishes. They are exceedingly indolent, and slovenly in their dress. Their children go almost naked; and the women have invented no other ornament but that of painting their eye-brows and lips of a blue colour. The sole pleasure and occupation of the men is hunting bears and rein-deer, and fishing whales. Though they have some Japanese customs, as that of singing with a quavering voice, yet, in general, they have a greater resemblance to the northern Tartars, or the Samoides, than to the natives of Japan.

In examining the people on the south and west of China, we find that the Cochin-chinese, who inhabit a mountainous region that lies south of China, are more tawny, and more ugly than the Chinese; and that the Tonquinese, whose country is more fertile, and who live under a colder climate than the Cochin-chinese, are more handsome and beautiful. Dampier tells us, that the Tonquinese are of a middle stature; and that, though their complexion be tawny, their skin is so smooth and delicate, that the smallest changes from redness to paleness are perceptible in their faces, a circumstance which distinguishes them from the other Indians. Their visage is generally flat and oval, their nose and lips well proportioned, their hair black, long, and very thick; and they use every art to make their teeth black. According to the relations annexed to Tavernier's voyages, the Tonquinese are
of

of a good stature, and of an olive colour. They have not the flat faces and noses of the Chingse; and they are, in general, much handsomer.

Thus, it appears, that these nations differ but little from the Chinese. In colour they resemble the inhabitants of the southern provinces of China. If they are more tawny, it is owing to their living under a warmer climate; and, though their faces and noses be more prominent, they may still be regarded as people sprung from the same origin.

The same observation applies to the natives of Siam, of Pegu, of Aracan, of Laos, &c. the features of all these nations having a striking resemblance to those of the Chinese; and, though they differ from the Chinese in colour, yet they differ much more from the other Indians. The stature of the Siamese, according to Loubère, is rather small; their bodies are well made; their faces are large, and their cheek-bones prominent; their forehead suddenly contracts, and terminates in a point, like the chin; their eyes are small and oblique; the white of the eye is yellowish; the cheeks are hollow, from the elevation of the upper part of the cheek-bones; the mouth is large, the lips thick, and the teeth black; their complexion is coarse, being a mixture of brown and red, or, according to other travellers, of an ash-colour, which is, perhaps, as much owing to the perpetual sultriness of the air, as to their birth: Their nose is short, and rounded

rounded at the point; their ears are naturally large, and are much esteemed when their size is remarkably great. This taste for long ears is common to all the eastern nations. Some draw the lob of the ear in order to lengthen it, and pierce it so as only to allow the admission of an ordinary pendant; and others, as the natives of Laos, widen the holes in their ears so prodigiously, that they will almost admit a man's hand; and, by this means, their ears descend to the top of their shoulders. With regard to the Siamese, however, their ears are naturally a little larger than ours. Their hair is coarse, black, and straight; and it is worn so short, both by the men and the women, that it reaches no lower than the ear all round the head. They anoint their lips with a kind of perfumed pomatum, which makes them appear unnaturally pale. They have little beard; and they always pull out the hairs: Nor is it customary to pare their nails, &c. Struys informs us, that the women of Siam wear pendants in their ears, so large and heavy, that the holes gradually grow wide enough to admit a thumb. He adds, that the colour of both men and women is tawny; that, though not tall, they are handsome; and that, in general, the Siamese are a mild and polished people. Father Tachard remarks, that the Siamese are very alert, and have among them dancers and tumblers as agile as those in Europe. He tells us, that the custom of black-
ening

ening their teeth proceeds from a notion they entertain of its being unseemly for men to have white teeth, like the brutes. They besmear them with black varnish, and abstain three or four days from meat, in order to make it adhere the more firmly.

The inhabitants of the kingdoms of Pegu and Aracan differ not from those of China and Siam, excepting in their colour, which is a little blacker *. The natives of Aracan are fond of large flat foreheads; and, to render them so, they apply a plate of lead to the foreheads of their children, immediately after birth. They have large open nostrils, small sparkling eyes, and ears so long that they rest upon their shoulders. They eat, without disgust, mice, rats, serpents, and putrified fish †. Their women are tolerably fair, and their ears are equally long as those of the men ‡. The people of Achen, who are still farther north than those of Aracan, have likewise flat visages, and olive complexions. They are exceedingly gross, and allow their boys to go quite naked; and the girls have only a thin plate of silver to save their blushes §.

All these nations, it is apparent, differ little from the Chinese, and resemble the Tartars in the smallness of their eyes, their flat visages, and their olive colour. But, in proceeding south-

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* See Pigafetta, p. 46. † See Voyages de Ovington, tom. 2. p. 274. ‡ See Le Recueil des voyages de la Compagnie Hollandoise, tom. 6. p. 257. § Ibid. tom. 4. p. 63. and de voyage de Mandello, tom. 2. p. 328.

ward, the features begin to be diversified in a more sensible manner. The inhabitants of Malacca, and of the island of Sumatra, are black, small, active, and well proportioned. Though naked from the middle upwards, excepting a small scarf which they carry sometimes on one shoulder and sometimes on the other *, they are naturally brave, and become formidable after taking their opium, which affects them with a kind of furious intoxication †. The inhabitants of Sumatra and of Malacca, according to Dampier, are of the same race. They speak nearly the same language; they have all a fierce and haughty temper; their stature is of a middle size; they have a long visage, black eyes, noses of a moderate bulk, thin lips, and teeth died black by the frequent use of betle ‡. In the island of Pugniatan, or Pissagan, about 6 leagues west of Sumatra, the natives are tall, and of a yellow colour, like the Brasilians. They wear long smooth hair, and go absolutely naked §. Those of the islands of Nicobar, to the north of Sumatra, are of a yellowish tawny complexion, and likewise go perfectly naked §. Dampier tells us, that the natives of the Nicobar islands are tall and handsome; that their visage is long, their hair black and smooth, and their noses of a moderate size; and that the women tear out the

* See Les Voyages de Gherardini, p. 46. † See Les Lettres edifiantes, recueil 2. p. 80. ‡ See Dampier, tom. 3. p. 156. § See Recueil de la Comp. de Holl. tom. 1. p. 281. § See Lettres edifiantes, recueil 2. p. 177.

the hairs from their eye-brows, &c. The natives of the island of Sombro, to the north of Nicobar, are very black, and they paint their faces with different colours, as green, yellow, &c. The people of Malacca, of Sumatra, and of the small adjacent islands, though they differ between themselves, differ still more from the Chinese, Tartars, &c. and seem to have originated from a different race; yet the natives of Java, who are in the neighbourhood of those of Sumatra and Malacca, have no resemblance to them, but are similar to the Chinese, excepting in colour, which, like that of the Malays, is red mingled with black. They likewise resemble, says Pigafetta †, the natives of Brazil; their complexion is coarse, and, though neither remarkably large nor small, they are squat, and exceedingly muscular; their faces are flat, their cheeks flabby and pendulous; their eye-brows large, and inclined to the temples; their eyes small, and their beards very black and thin. Father Tachard remarks, that the people of Java are robust and handsome; that they seem to be active and resolute; and that the extreme heat of the climate obliges them to go naked. From the *Lettres Edifiantes* ‡, it appears, that the natives of Java are neither black nor white, but of a purplish red colour; and that they are mild, familiar, and courteous.

Francis
 * See l'Hist. gen. des voyag. tom. 1. p. 387.
 † See Indiae Orientalis part 1. p. 31.
 ‡ Recueil 16. p. 13.

Francis Legat relates, that the women of Java, who are not exposed to the rays of the sun, are less tawny than the men; that their countenance is comely, their breasts prominent and well shaped, and their complexion, though brown, uniform and beautiful; that they have a delicate hand, a soft air, brilliant eyes, an agreeable smile; and that many of them dance with great elegance and spirit*. Most of the Dutch voyagers agree, that the natives of this island are robust, well made, and nervous; that their visage is flat, their cheeks broad and prominent, their eye-lids large, their eyes small, their hair long, and their complexion tawny; that they have little beard; that they wear their hair and nails very long; and that they polish their teeth with files †. In a little island fronting that of Java, the women are tawny, have small eyes, a large mouth, flat noses, and long black hair ‡.

From all these relations, we may conclude, that the inhabitants of Java greatly resemble the Tartars and Chinese; while those of Malacca, Sumatra, and the small adjacent islands, differ from them, both in their features and in the form of their bodies. Neither is it difficult to account for this phaenomenon; for the peninsula of Malacca, the islands of Sumatra and Java, as well

as the islands of the East Indies.

* See Les Voyages de France. Legat, tom. 2. p. 130.

† See Recueil des Voyages de la Comp. Holl. tom. 1. p. 392, and Mandello, tom. 2. p. 344.

‡ See Voyages de Gentil, tom. 3. p. 92.

as all the other islands in the Indian Archipelago, must have been peopled by the neighbouring nations on the continent; and even the Europeans themselves, who have had possession of them near three centuries. This circumstance must have produced a great variety among the inhabitants, both in the features and colour, and in the form and proportions of their bodies. In the island of Java, for example, there are a people called *Chacrelas*, who are totally different, not only from the natives of this island, but from all the other Indians. These Chacrelas are white and fair, and their eyes are so weak that they cannot support the rays of the sun. They go about, in the day, with their eyes half shut, and directed to the ground; but they see best during the night. All the inhabitants of the Molucca islands, says Pyrard, are similar to those of Sumatra and Java, in manners, mode of living, arms, customs, language, colour, &c. †. We learn from Mandello, that the men are rather black than tawny, and that the women are fairer; that their hair is black; that their eyes, eye-brows, and eye-lids, are large; that their bodies are strong and robust; that they are dexterous and agile; and that they live long, though their hair soon becomes hoary. This traveller likewise tells us, that each island has its own peculiar language, and that they have probably

* See Les Voyages de Legat. tom. 2. p. 137.

† See Les Voyages de Pyrard, tom. 2. p. 178.

bably been peopled by different nations *. The inhabitants of Borneo and of Bali, he adds, are rather black than tawny †; but, according to other travellers, they are only brown, like the other Indians ‡. Gemelli Carreri says, that the inhabitants of Ternate are of the same colour with the Malays, which is a little darker than those of the Philippine islands; that their countenances are comely; that the men are handsomer than the women; and that both sexes bestow much care on their hair ||. The Dutch travellers relate, that the natives of the island of Banda are remarkable for longevity; that they have seen a man aged 130, and many who approached to that uncommon period of life; that these islanders are, in general, exceedingly indolent; that the men do nothing but saunter abroad; and that all the laborious offices are executed by the women §. According to Dampier, the original natives of the island of Timor, which is one of those most adjacent to New Holland, are of a middle stature: They have erect bodies, delicate limbs, a long visage, black bristly hair, and a very black skin: They are dexterous and agile, but indolent to a shameful degree ¶. In another place, however, he says, that the inhabitants

* See Voyages de Mandello, tom. 2. p. 378.

† Ibid. tom. 2. p. 363.

‡ See Recueil des Voyages de la Comp. de Holl. tom. 2. p. 120.

§ See les Voyages de Gemelli Carreri, tom. 5. p. 224.

¶ See Les Voyages de la Comp. de Holl. tom. 1. p. 566.

• See Les Voyages de Dampier, tom. 5. p. 631.

bitants along the bay of Laphao, are mostly tawny and of a copper colour, and that their hair is black and flat.

Turning northward, we find Manila and the other Philippine islands, the inhabitants of which, by their alliances formed between the Spaniards, the Indians, the Chinese, the Malabars, the Negroes, &c. are perhaps more mixed than in any other part of the universe. These negroes, who live in the rocks and woods of Manila, are entirely different from the other inhabitants. Some of them have crisped hair, like the negroes of Angola, and others long hair; their colour consists of various shades of black. Among these, some have been seen who had tails four or five inches long, like the Islanders mentioned by Ptolemy †. This traveller adds, that he was informed by Jesuites worthy of credit, that, in the island of Mindoro, which is adjacent to Manila, there is a race of men, called *Manghians*, who have all tails of the same length; that some of these tailed men had even embraced the Catholic faith ‡; and that they had olive complexions and long hair ||. Dampier tells us, that the inhabitants of the island of Mindanao, which is one of the principal and most southerly of the Philippines, are of a middle stature; that their limbs are slender, their bodies thin and straight, their

* See Les Voyages de Dampier, tom. 1. p. 52.

† See Les Voyages de Gemelli Carreri, tom. 5. p. 68.

‡ Ibid. tom. 5. p. 92.

|| Ibid. tom. 5. p. 298.

their visages oval, their foreheads flat, their eyes black and small, their noses short, their mouths large, their lips thin and red, their teeth black, their hair smooth and black, their colour tawny and more yellow than several of the other Indian tribes; that the women are handsome and fairer than the men; that their visage is longer, and their features sufficiently regular, excepting the nose, which is short and flat; that their limbs are small, and their hair long and black; and that the men, in general, are alert and ingenious, but slothful and addicted to robbery. We learn from the *Lettres Edifiantes*, that the inhabitants of the Philippine islands resemble the Malays, who formerly conquered these islands; that, like them, the nose is short, the eyes large, the complexion of a yellowish olive colour, and their customs and language are nearly the same.

To the north of Manilla lies the island of Formosa, which is not far distant from the province of Fokien in China. But these islanders have no resemblance to the Chinese. Struys informs us, that the men of this island are of small stature, particularly those who live in the mountains; that they have flat faces; that the women have coarse full breasts, and a beard like the men; that their ears are long, and their length is increased by heavy shells which they employ for pendants; that their hair is black and long, and their complexion of a yellowish black colour; that some of them are of a whitish yellow,

low, and others entirely yellow; that they are extremely indolent, dexterous in managing the bow and the javelin, excellent swimmers, and run with incredible swiftness. Struys expressly declares, that, in this island, he saw a man with a tail more than a foot long, covered with reddish hair, and not unlike that of an ox; and that this tailed man assured him, that the tail was a consequence of the climate, for all the natives of the southern part of the island had tails of the same kind *.

I know not what credit is due to this relation of Struys: If the fact concerning the tails be true, it must be exaggerated; for it accords not with the accounts of other travellers, nor even with that of Ptolomy; and Marc Paul, in his Geographical description, says, that, in the mountains of the kingdom of Lambry, there are men with tails only about a palm long. It appears that Struys rests upon the authority of Marc Paul, as Gemelli Carreri does upon that of Ptolomy; and that the tail he pretends to have seen is very different in its dimensions from that ascribed by other travellers to the negroes of Manilla, the inhabitants of Lambry, &c.

The editor of the Memoirs of Psalmanazar, concerning the island of Formosa, makes no mention of these extraordinary men; but he remarks, that, though it be extremely warm in this island, the women are very fair and handsome, particularly those of them who are not

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* See les Voyages de Struys, tom. 1, p. 100.

exposed to the rays of the sun; that they anxiously preserve their complexion by the use of certain lotions; that they are equally attentive to the beauty of their teeth, and, instead of painting them black, like the Chinese and Japanese, they use every art to preserve their whiteness; that the men are not tall, but thick and strong; and that they are, in general, vigorous, indefatigable, good soldiers, very dexterous*, &c.

The Dutch voyagers, in their accounts of the natives of Formosa, differ from all those we have hitherto mentioned. Mandello, as well as the writers of the collection of voyages which paved the way for the establishment of the Dutch East-India Company, inform us, that these islanders are taller than the Europeans; that their colour is brownish black; that their bodies are hairy; and that the women are of a low stature, but robust, fat, and tolerably proportioned. In most of the writers on this island, there is no mention of men with tails; and they differ widely from each other in their descriptions of the form and features of the natives. But, with regard to one fact, which is no less extraordinary, they seem entirely to agree; namely, that the women are not permitted to bear children till the age of 35, though they are at liberty to marry long before that period. Speaking of this custom, **Rechteren**

* See la description de l'isle Formose, dressée sur le Memoires de George Psalmanazar, par le sieur N. F. D. B. R. p. 103.

The Count de Buffon seems not have known, that Psalmanazar was an impostor, and his book a mere fiction; otherwise he would never have quoted him as an author of credit.

Rechteren expresses himself in the following terms: 'After marriage, the women are not allowed to be mothers till they have completed their 35th or 37th year. When they are pregnant before this period, their priestesses trample with their feet upon the women's bellies, and in this manner force them to miscarry, an operation much more painful and dangerous than a natural labour. But it is disgraceful, and even a high crime to allow a child to come in to the world before the age prescribed. I have seen women who had 16 of these forced miscarriages, and were only permitted to bring forth their 17th child †.'

The Mariana or Ladrone islands, which are the most remote from the eastern coast, are inhabited by a rude and unpolished people. Father Gobien tells us, that, till the arrival of the Europeans, they had never seen fire, and that they were extremely surprised when this element was first exhibited to them by Magellan. Their colour is tawny, though somewhat fairer than that of the natives of the Philippines; they are stronger and more robust than the Europeans; they are tall and well proportioned: Though they feed solely on roots, fruits, and fish, yet they are fat and corpulent; but their corpulency prevents them not from being nimble and active. They live so long, that the age

† See les Voyages de Recteren dans le Recueil de Voyages de la comp. de Holl. tom. 5. p. 96.

age of 100 years is not extraordinary among them, without ever experiencing disease or sickness *. We are told by Gemelli Carreri, that the natives of these islands are of a gigantic size, and that they are so strong, that they can with ease carry on their shoulders a weight of 500 pounds †. In general, their hair is crisped ‡, their nose and eyes are large, and their complexion is like that of the Indians. The inhabitants of Guam, one of these islands, have long black hair, a large nose, thick lips, white teeth, a long visage, a ferocious aspect; they are likewise exceedingly robust, and their stature, it is said, extends to seven feet in height ||.

To the south of the Mariana islands, and eastward of the Moluccas, we find the land of the Papous and New Guinea, which seem to be the most southerly regions of the globe. According to Argensola, the Papous are as black as the Caffres, have crisped hair, and a meagre and disagreeable visage: Among these people, however, there are some who are as white and fair as the Germans; but their eyes are weak and delicate §. We are also informed by Le Maire, that the natives of this country are very black, savage, and brutal. They wear rings in their ears.

* See l'hist. des Isles Mariannes, par le P. Gobien.

† See les Voyages de Gemelli Carreri, tom. 5. p. 298.

‡ See lettres edifiantes, recueil 18. p. 198.

|| See Dampier, tom. 1. p. 378. and also Cowley's voyage round the world.

§ See l'hist. de la conquête des isles Moluques, tom. 1. p. 148.

ears and noses, and sometimes in the partition of the nose. They likewise wear bracelets of mother of pearl above the elbows and on the wrists, and they cover their heads with caps made of the bark of trees, painted with different colours. They are strong and well proportioned, have black teeth, a pretty good beard, and black and crisped hair, though not so woolly as that of the negroes. They are swift in the chase; and, as the use of iron is unknown to them, their weapons consist of clubs, lances, and spears, made of hard wood. They likewise use their teeth as offensive weapons, and bite like dogs. They eat betle and pimenta mixed with chalk, which also serves them for powder to their beards and hair. Their women have a disgusting aspect: They have long breasts which hang down to the navel, very prominent bellies, small arms and limbs, the visage of an ape, and hideous features*. Dampier tells us, that the natives of the island of Sabala, in New Guinea, are a kind of tawny Indians, with long black hair, and who differ not in manners from those of the island of Mindanao, and of the other eastern isles; that, beside these, who appear to be the principal inhabitants of New Guinea, there are also negroes with frizled woolly hair†. Speaking of another of these islands called *Garret-Denys*, our author remarks, that the inhabitants

* See *La Navigation australe de Jacques le Maire*, and *Les Voyages de la Comp. de Holl.* p. 648. tom. 4.

† See Dampier, tom. 5. p. 82.

are black, robust, and well made; that they have large round heads, and short crisped hair, which they cut in different fashions, and paint with various colours, as red, white, and yellow; that they have large round faces, and broad and flat noses; that their countenances, however, would not be absolutely disgusting, if they did not thrust through their nostrils a kind of peg, about an inch thick and four inches long, so that each end of it rests upon their cheek-bones, and only a small part of the nose appears around this unnatural ornament; and that they wear similar pegs in their ears*.

The natives of the coast of New Holland, which is situated in the 16th degree of south latitude, and beyond the island of Timor, are perhaps the most miserable of the human species, and approach nearest to the brutes. They are tall, erect, and thin; their limbs are long and slender; they have large heads, a round forehead, and thick eye-brows: Their eye-lids are always half-shut, a habit which they contract in infancy, to protect their eyes from the gnats; and, as they never open their eyes, they cannot see at a distance, without raising their heads as if they were looking at something above them. They have thick noses and lips, and large mouths: They pull out, it would appear, the two fore-teeth of the upper-jaw; for, in neither sex, nor at any period of life, are these teeth to be

* See Dampier, p. 102.

be seen. They have no beard; their visage is long, without a single feature that is agreeable; their hair is short, black, and crisped; and their skin is as black as that of the Guiney Negroes. They have no cloathing but a piece of the bark of a tree tied round their waist, with a handful of long herbs in the middle. They have no houses, and they sleep on the ground without any covering. They associate, men, women, and children, promiscuously, to the number of 20 or 30. Their only nourishment is a small fish which they catch in reservoirs made with stones in small arms of the sea; and they are totally unacquainted with bread, and every species of grain *.

In another part of the coast of New Holland, about the 22d or 23d degree of south latitude, the natives seem to be of the same race with those we have now described. They are extremely ugly and disgusting, and have the same defect in their eyes; their skin is black, their hair crisped, and their bodies are tall and slender †.

From these descriptions, it is apparent, that the islands and coasts of the Indian ocean are peopled with men of very different races. The natives of Malacca, of Sumatra, and of the Nicobar islands, seem to derive their origin from the inhabitants of the peninsula of Indus; and those of Java from the Chinese, excepting the white

* See Dampier, tom. 2. p. 171.

† Ibid. tom. 4. p. 134.

white men called *Chacrelas*, who must have sprung from the Europeans. The natives of the Molucca islands seem also, in general, to have proceeded from the Indian peninsula. But the inhabitants of the island of Timor, which lies nearest to New Holland, are very similar to the people of that country. Those of Formosa, and of the Mariana islands, resemble each other in stature, strength, and features, and they appear to form a race entirely distinct from every other people in their neighbourhood. The Papous, and other nations adjacent to New Guinea, are real negroes, and resemble those of Africa, though they are separated from that continent by a tract of sea more than 2200 leagues over. The natives of New Holland have a strong analogy to the Hottentots. But, before drawing any conclusions from all these relations and discrepancies, it is necessary to examine the condition of the nations of Asia and Africa.

The Moguls, and other natives of the peninsula of India, nearly resemble the Europeans in traits and features; but they differ more or less from them in colour. The Moguls are olive, though, in the Indian language, *Mogul* signifies *white*. The women are extremely handsome, and make frequent use of bathing. Like the men, they are of an olive colour, and, what is opposite to the women of Europe, their legs and thighs are long, and their bodies short *. Ta-

vernier

* See Les Voyages de la Boulaye le Gouz, p. 153.

vernier says, that, after passing Lahor, and the kingdom of Cashmire, the Mogul women have naturally no hair on any part of the body, and that the men have very little beard *. According to Thevenot †, the Mogul women, though chaste, are very fruitful, and they bring forth with so much ease, that they frequently walk the streets the very next day after delivery. He adds, that, in the kingdom of Decan, the men marry at ten, and the women at the age of eight years, and that they often have children at this early period; but the women who have children so soon, commonly cease to bear after the age of 30, when they are wrinkled, and have all the appearances of decrepitude. Some of these women have their skin punctured in the form of flowers, and painted with the juices of plants, so that the skin has the appearance of being stuffed with flowers ‡.

The natives of Bengal are yellower than the Moguls; their manners are also totally different: Their women, instead of being chaste, are supposed to be the most lascivious in India. A great slave-trade, both of males and females, is carried on in this country; and a number of eunuchs are made, both by a simple privation of the testicles, and by a total amputation of the parts. The Bengaliens are handsome and beautiful;

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* See Voyages de Tavernier, tom. 3. p. 80. † Tom. 3. p. 246. ‡ Tavernier, tom. 3. p. 34.

they love commerce, and have a great deal of mildness in their manners.

The natives of the Coromandel coast are blacker than those of Bengal; they are also less civilized, and go almost naked. Those of the Malabar coast are still blacker. They have very long, smooth, black hair, and are of the same size with the Europeans. The women wear gold rings in their noses; and both men and women, and young girls, bathe promiscuously in ponds made for the purpose in the middle of their towns. The women, though black, or at least exceedingly brown, are comely and handsome, and they marry at the age of eight years †.

The customs of the different Indian nations are all very singular, if not whimsical. The Barmians eat nothing that is animated; they even dread to kill the smallest insect, and will not destroy the louse that bites them. They throw rice and beans into the rivers, to nourish the fishes, and grain upon the ground, to feed the birds and insects. When they meet a hunter or a fisher, they earnestly beg of him to desist: If he be deaf to their entreaties, they offer him money for his gun or net; and, if he does not comply, they trouble the waters to frighten the fishes, and set up hideous cries to put the birds and other game to flight ‡.

The

* See Voyages de Pyrard, p. 34.

† See Recueil des Voyages, tom. 6, p. 461.

‡ See Voyages de Struys, tom. 2, p. 225.

The Naires of Calicut form a band of nobles, whose only profession is that of arms. These men, though of an olive colour, are comely and handsome. They are tall and hardy, full of courage, and very dexterous in the management of their weapons. They lengthen their ears to such a pitch, that they hang down on their shoulders, and sometimes lower. These Naires are allowed only one wife; but the women may have as many husbands as they please. Father Tachard, in his letter to Father la Chaize, dated at Pondicherry February 16, 1702, tells us, that, in the cast or class of nobles, a woman sometimes has 10 husbands, whom they regard as slaves subjected to their beauty. This privilege is confined to ladies of rank; for the women of inferior condition are allowed but one husband; The latter, indeed, take care to alleviate this hardship by their commerce with strangers, to whose embraces they abandon themselves without reserve; and their husbands dare not so much as challenge them. The mothers prostitute their daughters even before they arrive at a proper age. The Naires or nobles of Calicut seem to be of a different race from the burgeses; for the latter, both males and females, are of a smaller stature, and are worse shaped, and more ugly *. Among the Naires there are some men, as well as women, whose legs are as thick as the body of an ordinary man. This deformity is not a consequence

* See Pyrard, p. 411.

consequence of disease; before they have it from their birth. In some this monstrous thickness is confined to one leg only. The skin of these legs is hard and rough like a wart. Notwithstanding this cumbersome deformity, the persons affected with it are nimble and active. This race of men with thick legs have not multiplied greatly, either among the Naires or the other Indians. They, however, appear in other places, and especially in Ceylon*, where they are said to be of the race of St Thomas.

The natives of Ceylon are similar to those of the Malabar coast. Though they are not equally black†, they have large ears which hang down to their shoulders. Their aspect is mild; and they are naturally alert, dexterous, and vivacious. Their hair, which is very black, is worn short by the men. The common people go almost naked; and the women, according to a custom pretty general in India, have their bosoms uncovered‡. In the northern part of the island of Ceylon, there is a species of savages called *Bedas*, who occupy only a small district, and seem to be of a peculiar race. The spot they inhabit is entirely covered with wood, in which they conceal themselves so closely, that it is difficult to discover any of them. Their complexion is fair,

* Ibid. p. 416. See also *Recueil des voyages de la Comp. de Holl.* tom. 4. p. 362.

part. 1. p. 39.

† See *Pigafettae Ind. Orient.*

‡ See *Recueil des voyages, &c.* tom. 7.

p. 19.

fair, and sometimes red, like that of the Europeans. Their language has no analogy with any of the other Indian languages. They have no villages nor houses, and hold no intercourse with the rest of mankind. Their arms consist of bows and arrows, with which they kill a number of bears, stags, and other animals. They never dress their meat, but they season it with honey, with which they are plentifully provided. We are ignorant of the origin of this tribe, who are not numerous, and who live in detached families*. These Bedas of Ceylon, as well as the Chacrelas of Java, who are both fair and few in number, appear to be of European extraction. It is probable, that some European men and women have been formerly left on these islands by shipwreck, or otherwise, and that, for fear of being maltreated by the natives, they and their descendants confined themselves to the woody and mountainous parts of the country, where they continue to live a savage life, which, perhaps, wants not its charms to those who are accustomed to it.

The natives of the Maldiva islands are supposed to have descended from those of Ceylon, though there is no resemblance between them: For the natives of Ceylon are black and deformed; but those of the Maldiva islands are handsome, and, excepting their olive colour, little different from the Europeans; besides, they

* See l'hist. de Ceylon, par Ribeyro, p. 177.

they are a people composed of all nations. The inhabitants of the northern parts of those islands are more civilized than those who inhabit the southern parts. The women, notwithstanding their olive colour, are beautiful, and some of them are as fair as the Europeans. Their hair is universally black: This they regard as a beauty; and they studiously render the hair black by shaving the heads of their boys and girls, every eight days, till they arrive at the age of nine or ten. This practice, it is probable, contributes to blacken the hair; for, though every man and woman has black hair, that of their children is sometimes pretty fair. Another beauty among the women is to have their hair very long and very thick, and, for this purpose, they anoint their head and body with a perfumed oil. The men are more hairy than those of Europe. These islanders love exercise, and are industrious artists; they are superstitious, and much addicted to venery; though the women carefully conceal their bosoms, they are exceedingly indolent and debauched; they perpetually eat betle and other hot spices. As to the men, they are less vigorous than their spouses would incline*.

The natives of Cambaia are more or less of an ash-colour; and those who live near the sea are more swarthy than the others†. Those of Guzarat

* See les Voyages de Pyrard, p. 120. et 324.

† See Pigafettae Ind. Orient. part. 1. p. 34.

Guzarat are yellow^{*}; and the Canurias, or the inhabitants of Goa and of the neighbouring islands, are olive[†].

We are informed by the Dutch voyagers, that the natives of Guzarat are more or less yellow; that their stature is the same with the Europeans; that the women, who seldom expose themselves to the sun, are fairer than the men, and that some of them are nearly as white as the Portuguese[‡].

Mandelló says, that the inhabitants of Guzarat are all more or less tawny, or olive, according to the climate they live under; that the men are strong and well made, and have large faces and black eyes; that the women are little, but handsome; and that they wear long hair, pegs in their noses, and large pendants in their ears^{||}. There are very few deformed persons among them; some of them are fairer than others; but all have black straight hair. The antient inhabitants of Guzarat are easily distinguished from the others by their colour, which is much blacker; they are likewise more barbarous and stupid[§].

Goa is the principal settlement of the Portuguese in India; and, though its antient splendour is much decayed, it still continues to be an opulent

* See Voyages de la Boulaye le Gouz. p. 225.

† Id. Ibid.

‡ See Recueil des Voyages, &c. tom. 6.

p. 405.

|| See Mandelló, p. 195.

§ Ibid. tom. 3.

p. 222.

opulent and commercial city. It was formerly the greatest market for slaves in the whole world. Handsome women and girls were sold here from every nation of Asia. These slaves were of all colours; and they were skilled in music, and in every species of sewing and embroidery. The Indians were most enamoured with the Caffre girls from Mosambique, who are all black. 'It is remarkable,' says Pyrard, 'that the sweat of the Indians, whether male or female, has no unfavoury odor, while the stench of the African negroes, when they are over-heated, is perfectly unsupportable.' He adds, that the Indian women are fond of the European men, and prefer them even to the white Indians*.

The Persians are adjacent to the Moguls, and have a great resemblance to them; those especially who inhabit the southern parts of Persia differ very little from the Indians. The natives of Ormus, and of the provinces of Bascia and Balascia, are very brown and tawny; those of Chesmur, and of the other provinces of Persia, where the heat is not so great as at Ormus, are fairer; and those of the northern provinces are tolerably white†. According to the Dutch travellers, the women in the islands of the Gulph of Persia are brown or yellow, and not at all agreeable. They have a large visage, and ugly

* See Pyrard, tom. 2. p. 64. † See la Description des Provinces Orientales par Marc Paul, p. 22. 39. and Pyrard, tom. 2. p. 256.

ugly eyes. In some of their manners and customs, they resemble the Indian women, as that of wearing rings in the cartilage of the nose, and of passing a gold pin through the skin of the nose, near the eyes. Indeed, this custom of piercing the nose for the purpose of embellishing it with rings and other trinkets, has extended much farther than the Gulph of Persia; many of the Arabian women wear rings in their noses; and it is a piece of gallantry among the men to salute their wives through these rings, which are sometimes so large, that they encircle the whole mouth †.

Xenophon says, that the Persians were generally thick and fat. Marcellinus, on the contrary, tells us, that, in his time, they were thin and meagre. Olearius agrees with the last author, and adds, that they are strong and hardy; and that they are of an olive colour, and have black hair and aquiline noses ‡.

That the blood of the Persians, says Chardin, is naturally gross, appears from the Guebres, who are a remnant of the antient Persians, and are an ugly, ill made, rough skinned people. This is also apparent from the inhabitants of the provinces in the neighbourhood of India, who are nearly as clumsy and deformed as the Gue-

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* See *Recueil des Voyages de la Comp. de Holl.* tom. 5. p. 191.

† See *le Voyage fait par ordre du Roi dans la Palestine*, par M. D. L. R. p. 260.

‡ See *Voyage d'Olearius*, tom. 1. p. 501.

bres, because they never form alliances with any other tribes. But, in the other parts of the kingdom, the Persian blood is now highly refined by frequent intermixtures with the Georgians and Circassians, two nations who surpass all the world in personal beauty. There is hardly a man of rank in Persia who is not born of a Georgian or Circassian mother; and even the King himself is commonly sprung, on the female side, from one or other of these countries: As it is long since this mixture commenced, the Persian women have become very handsome and beautiful, though they do not rival the ladies of Georgia. The men are generally tall and erect; their complexion is ruddy and vigorous, and they have a graceful air, and an engaging deportment. The mildness of the climate, joined to their temperance in living, have a great influence in improving their personal beauty. This quality they inherit not from their fathers; for, without the mixture mentioned above, the men of rank in Persia, who are descendants of the Tartars, would be extremely ugly and deformed. The Persians, on the contrary, are refined and ingenious; their imagination is lively and fertile; though warlike, they are lovers of the arts and sciences; they are vain, and extremely ambitious of praise; their temper is soft and ductile; they are voluptuous, and much addicted to gallantry and intrigue; they are luxurious and prodigal, and

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are equally strangers to economy and to commerce.

The Persians, though in general pretty sober, devour vast quantities of fruit. Nothing is more common than to see a man eat 12 pounds of melons; some will devour three or four times that quantity; and many of them fall a sacrifice to this excessive appetite for fruit.

Fine women, of all complexions, are common in Persia; for they are selected by the merchants, from every country, on account of their beauty. The white women are brought from Poland, from Muscovy, from Circassia, from Georgia, and from the frontiers of Great Tartary. The tawny women are transported from the Mogul's dominions, and from the kingdoms of Golconda and Visapore, and the blacks from Melinda and the coasts of the Red Sea. A strange superstition prevails among the inferior class of women: Those who are barren, imagine passing under the dead bodies of suspended criminals, will render them fruitful; they even believe that the influence of a male corpse, though at a distance, is sufficient to impregnate them.

When this absurd remedy does not succeed, they go into the canals of water which run from the baths; when they know that many men are employed in bathing themselves; and, if this specific

* See Chardin, tom. 2. p. 34.

† See les Voyages

de Thevenot, tom. 2. p. 181.

† See les Voyages de

Tavernier, tom. 2. p. 368.

specific be equally unsuccessful as the former, their last resource is to swallow that part of the prepuce which is cut off in the operation of circumcision, which they consider as a sovereign remedy against sterility.*

The inhabitants of Persia, of Turkey, of Arabia, of Egypt, and of all Barbary, may be regarded as the same race of people, who, in the time of Mahomet and his successors, extended their dominions by invading immense territories, and became exceedingly diversified by intermixing with the original natives of all these different countries. The Persians, the Turks, and the Moors, have acquired a degree of civilization: But the Arabs have generally continued in a state of lawless independency. Like the Tartars, they live without government, without law, and almost without society. Rape, theft, and robbery, are authorised by their chiefs. They glory in their vices, and have no regard to virtue; and they despise every human institution, excepting those only which produce superstition and fanaticism.

The Arabs, however, are enured to labour. They likewise accustom their horses to undergo the greatest fatigue, and allow them to drink only once in 24 hours. Their horses are meagre, but swift, and almost indefatigable. These people live in extreme misery. They have neither bread nor wine; neither do they take the trouble

* See les Voyages de Gemelli Carreri, tom. 2. p. 200.

ble of cultivating the ground. In place of bread, they use some wild grain, which they mix and knead with the milk of their cattle *. They have flocks of camels, sheep, and goats, which they conduct from place to place till they find sufficient herbage for them. Here they erect their tents, which are made of goats hair, and live with their wives and children till the grass is consumed; they then decamp, and go in quest of another fertile spot †. Though their mode of living be hard, and their food extremely simple, the Arabs are strong and robust; even their stature is not small, and they are pretty handsome. But their skin is scorched with the heat of the sun; for most of them go either entirely naked, or are covered only with a tattered shirt ‡. Those who live on the coasts of Arabia Felix, and of the island of Socotora, are of smaller stature; their complexion is ash-coloured or tawny, and in the form of their bodies they have a great resemblance to the Abyssinians ||. The Arabs paint their arms, their lips, and the most conspicuous parts of their body, of a deep blue colour. This paint, which they lay on in small dots, and make it penetrate the flesh by means of a needle made for the purpose, can never be effaced §. This singular custom prevails like-

* See *Les Voyages de Villamon*, p. 603.

† See *Les*

Voyages de Thevenot, tom. 1. p. 330.

‡ *Voyages de Vil-*

lamon, p. 604. || See *Pigafettae Ind. Orient.* part. 3. p. 25.

and *Olearius*, tom. 2. p. 100. § *Voyages de Pietro della Valle*, tom. 2. p. 269.

who among the Negroes who trade with the Mahometans. Among the Arabs who live in the desert on the frontiers of Tamesen and Tunis, the girls, to improve their beauty, paint their bodies with oysters of a blue colour, which they accomplish by means of vitriol and the point of a lancet. In this they are followed by the country Africans, but not by those who live in towns, for there they preserve the same colour they bring with them into the world. Some of them, indeed, paint a small flower on their cheek, their forehead, or their chin, with the smoke of galls and saffron, which makes a fine black colour. They likewise blacken their eyebrows. La Boulaye informs us, that the Arabian women of the Desert paint their hands, lips, and chin, of a blue colour; that most of them wear rings of gold or silver, about three inches diameter, in their noses; that, although they are born fair, their complexions are spoiled by being continually exposed to the sun; that the young girls are extremely agreeable, and sing perpetually; but their songs are not melancholy and plaintive like those of the Turks, but have a still stranger effect, because they raise their voice, to the highest pitch, and articulate with great rapidity. The Arabian princesses and ladies, another traveller remarks, whom I was permitted to

* See L'Afrique de Marmol, tom. I. p. 88. † Voyages de la Boulaye le Gouz, p. 318.

' see, were extremely handsome, beautiful, and
 ' fair, because they are always covered from the
 ' rays of the sun. But the common women be-
 ' side their natural tawny complexion, are very
 ' much blackened by the sun; their form is ex-
 ' ceedingly disagreeable, and, excepting these
 ' natural attractions which always accompany
 ' youth, I could never perceive any thing in their
 ' appearance that could please the fancy. These
 ' women puncture their lips with needles, and
 ' cover them with gun-powder, and the gall of
 ' oxes, which penetrate the skin, and render
 ' their lips blue and livid during life. They
 ' practice the same art upon the angles of the
 ' mouth, on each side of the chin, and upon the
 ' cheeks. They blacken the eye-lids with a
 ' black powder, and draw a black line from the
 ' corner of each eye, in order to make them ap-
 ' pear more expanded; for the chief beauty of
 ' the eastern women consists in large, prominent
 ' eyes. Female beauty among the Arabs is ex-
 ' pressed by saying, That she has the eyes of
 ' the antelope. They always compare their
 ' mistresses to this sprightly animal; and black
 ' eyes, and the eyes of the antelope, are the
 ' principal topics of their love songs. The an-
 ' telope is indeed a most beautiful and hand-
 ' some creature, and has in its aspect a certain
 ' degree of innocent timidity, which resembles
 ' in a striking manner, the modesty and appre-
 ' hension natural to young women. The ladies
 ' and new married wives blacken their eye-brows,

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and make them join in the middle of the forehead. They puncture their arms and hands, and form upon them the figures of animals, flowers, &c. and paint their nails of a reddish colour: The men also paint their hair and the tails of their horses with the same colour. The women pierce their ears in several places, for the purpose of hanging rings and broaches to them, and they also wear bracelets on their arms and legs *. To this account it may be added, that the Arabs are exceedingly jealous of their wives; and that, though they either purchase them, or carry them off by force, they treat them with gentleness, and even with respect.

The Egyptians, though adjacent to the Arabs, and though governed by the same laws, and professing the same religion, are very different in their manners and customs. In all the towns and villages along the Nile, for example, we find young girls destined by the public to the pleasure of travellers, without any obligation to pay for this indulgence. For this species of hospitality, they have houses filled with these girls; and it is a pious practice with rich men, when about to die, to found and endow houses for this charitable purpose. When any of these young women bring forth male children, the mothers are obliged to rear them to the age of three or four years; after which the children are

* See *Le Voyage fait par ordre du Roi dans la Palestine*, par M. D. L. R. p. 260.

are carried to the patron of the house, or his representatives, who then take charge of them, and employ them as slaves. But the female children continue with their mothers, and supply their place *. The Egyptian women are very brown, but have lively eyes †. Their stature is above the middle size; their dress is not agreeable; and their conversation is exceedingly tiresome ‡. They are remarkable for bearing many children; and some travellers pretend, that the fertility occasioned by the inundation of the Nile, is not limited to the soil alone, but extends to men and other animals. They add, that the women uniformly conceive after either drinking, or bathing in the new water; that, in July and August, the women are generally impregnated, and bring forth in April and May; and that the cows commonly produce two calves, and the ewes two lambs ||, &c. It is difficult to reconcile these benign influences of the Nile with the troublesome diseases it occasions; for M. Granger informs us, that the air of Egypt is unwholesome; that diseases of the eyes are frequent, and so very difficult to cure, that the patients generally lose their sight; that in Egypt there are more blind persons than in any other country; and that, during the increase of the Nile, most of the inhabitants are seized with ob-

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* See *Les Voyages de Paul Lucas*, p. 363.

† *Les Voyages de Gemelli Carreri*, tom. 1. p. 190.

‡ *Les Voyages du P. Vanleeb*, p. 43.

|| *Les Voyages du Sieur Lucas*, p. 83.

stimate dysenteries, occasioned by the salts with which the water is then impregnated*.

Though the Egyptian women are commonly small, yet the men are of a good size†. In general, both sexes are of an olive colour; and the higher we ascend from Cairo, the natives become more tawny, till we arrive at the confines of Nubia, where they are almost as black as the Nubians themselves. Idleness and cowardice are the principal vices of the Egyptians. Their chief employment through the day is drinking coffee, smoking tobacco, sleeping, and chattering in the streets. They are grossly ignorant, and yet they are puffed up with a fantastical vanity. Though they acknowledge that they have lost their antient dignity, their skill in science and in arms, their history, and even their language, and that, from a valiant and illustrious nation, they have degenerated into slavery and cowardice; yet, such is the haughtiness of their disposition, that they affect to despise all other nations, and are exceedingly offended when any person advises them to send their children into Europe, to be instructed in the arts and sciences‡.

The numerous nations who inhabit the coasts of the Mediterranean, from Egypt to the Western ocean, and the internal regions of Barbary, as far as Mount Atlas, are composed of people of

* See Granger's Voyage, p. 21.
della Valle, tom. 1. p. 401.
and P. Vanseeb, p. 42.

† Voyages de Pietro
‡ See Lucas, tom. 3. p. 194.

of different races, as the original natives, Arabs, Vandals, and Spaniards; and, in more antient times, the Romans and Egyptians peopled these territories with men of very different qualities. The inhabitants of the mountains of Arras, for example, have no resemblance in their aspect and complexion to the adjacent tribes. Their colour, instead of being tawny, is white and ruddy, and their hair is of a deep yellow; but that of the adjacent nations is black. From these circumstances Mr Shaw thinks it probable, that they are descendants of the Vandals, who, after their expulsion, took refuge in certain parts of these mountains*. The women of the kingdom of Tripoli, though adjacent to those of Egypt, have not the smallest resemblance to them. The former are tall, and consider height of stature as an essential article of beauty. Like the Arabian females, they puncture and paint their cheeks and chin; and, as in Turkey, they are so fond of red hair, that they paint that of their children with vermilion†.

The Moorish women, in general, affect to wear their hair so long as to reach to their heels; and those whose hair is shorter, use false locks twisted round with ribbands. They paint the hair of their eye-lids with black lead, and they esteem the dark colour which this substance gives to the eyes as a singular beauty. This custom

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* See Shaw's travels.
La Haie, 1704.

† L'Etat des royaumes de Barbarie,

is both very general and very antient; it was practised by the ladies of Greece and Rome, as well as by those of the East*.

Most of the Moorish women would be reckoned handsome even in Europe. The skin of their children is exceedingly fair and delicate; and, though the boys, by being exposed to the sun, soon grow swarthy; yet the girls, who keep more within doors, preserve their beauty till the age of 30, when they commonly give over child-bearing: But, as a recompense for this early sterility, they are often mothers at the age of 11, and grandmothers at that of 22; and, as they live as long as the European women, they generally see several generations†.

In reading Marmol's description of these different nations, it is obvious to remark, that the inhabitants of the mountains of Barbary are white, and that those of the plains and sea-coasts are very brown and tawny. He tells us, that the inhabitants of Capez, a city in the kingdom of Tunis, situated upon the Mediterranean coast, are poor, and very black‡; that those who live along the banks of the river Dara in the kingdom of Morocco, are exceedingly tawny§; and that, on the contrary, the inhabitants of Zarhou, and of the mountains of Fez, on the side of Mount Atlas, are very fair: He adds, that the latter are so little affected with cold, that, in the greatest

* Shaw's travels.
536.

† Ibid.

‡ Ibid. tom. 2. p. 125.

§ Marmol, tom. 2. p.

greatest frosts and snow, they dress very lightly, and go with their heads uncovered during the whole year *. And, with regard to the Numidians, he says, that they are rather tawny than black; that the women are pretty fair and jolly, though the men are meagre †; but that the inhabitants of Guaden, at the extremity of Numidia, and on the frontiers of Senegal, are rather black than tawny ‡; that, on the other hand, the women of the province of Dara are beautiful and fresh-coloured; and that, through this whole region, there are multitudes of negroe slaves of both sexes §.

It appears, then, that, in the antient Continent, all the nations who live between the 20th and 30th, or 35th degree of north latitude, namely, from the Mogul Empire to Barbary, and even from the Ganges to the western coast of Morocco, differ but little from each other, excepting those varieties which have arisen from a mixture with more northern nations, who, from time to time, have conquered and peopled some of those vast regions. In this extensive territory, which stretches, within the same parallels, about 2000 leagues, the men, in general, are brown and tawny, but, at the same time, pretty comely and handsome. If we next examine those who live under more temperate climates, we shall find, that the natives of the northern parts

* Marmol, tom. 2. p. 198. 305.

† Ibid. tom. 3. p. 6.

‡ Ibid. tom. 3. p. 7.

§ Ibid. tom. 3. p. 11.

parts of the Mogul and Persian Empires, the Armenians, the Turks, the Georgians, the Mingrelians, the Circassians, the Greeks, and the people of Europe in general, are the fairest, and most handsome men in the world; and that, however remote Cashmire may be from Spain, or Circassia from France, the natives of these countries, which are nearly at an equal distance from the equator, have a striking resemblance to each other. The people of Cashmire, Bernier remarks, are renowned for their beauty. They are as handsome as the Europeans, and have no features of the Tartarian visage; neither have they those flat noses and pig-eyes so universal among the adjacent nations. Their women are exceedingly beautiful; and it is a common practice with strangers, when they come to the Mogul court, to provide themselves with Cashmirian wives, that they may have children by them as fair as true Moguls*.

The blood of Georgia is still more refined than that of Cashmire. In this country, not an ugly countenance is to be seen: And, with regard to the women, nature has adorned them with a profusion of grace: They are tall, handsome, slender waisted; and their faces are truly charming†. The men are likewise very handsome‡. They are naturally ingenious; and, if

* See Voyage de Bernier, tom. 2. p. 281.

Chardin, p. 204.

† See il Genio vagante del Conte Aurelio degli Anzi, tom. I. p. 170.

‡ See

if their education did not render them extremely ignorant and debauched, they might make no inconsiderable progress in the arts and sciences. But there is not, perhaps, a country in the universe where drunkenness and libertinism have arrived at so high a pitch as in Georgia. Chardin tells us, that even the clergy are much addicted to wine; that they keep a number of female slaves in their houses, whom they use as concubines; and that nobody is offended at this practice, because it is general, and even authorised. He adds, that he was informed by the prefect of the Capuchins, that the Patriarch of Georgia declares publicly, that the man who does not get drunk at their great festivals, as those of Easter and Christmas, is unworthy of the name of a Christian, and ought to be excommunicated*. With all these vices, however, the Georgians are a civil, humane, grave, and peaceable people. They seldom indulge resentment; but, when they conceive a hatred against any person, they are never to be reconciled.

The women of Circassia, Struys remarks, are likewise exceedingly fair and beautiful. Their complexion consists of the most delicate tints. Their forehead is large and smooth; and, without the assistance of art, their eye-brows are so fine, that they resemble curved threads of silk. Their eyes are large, attracting, and full of fire. Their noses are well shaped, and their lips are perfect

* Chardin, p. 205.

perfect vermilion. Their mouth is small, and the perpetual residence of smiles; their chin is the termination of the completest oval. Their neck and throat are extremely handsome; their skin is white as snow; the colour of their hair is a beautiful black; their stature is tall, and their carriage easy. They wear a little black cap, upon which is fastened a roller of the same colour. But, what is extremely ridiculous, the widows, in place of this roller, wear a bladder of an ox or a cow, fully blown up with air, which disfigures them amazingly. In summer, the women of inferior station wear only a shift, which is generally blue, yellow, or red, and open to the middle of the body. Their breasts are finely formed; and, though pretty familiar with strangers, they are faithful to their husbands, who are by no means jealous of them*.

Tavernier also informs us, that the women of Comania and Circassia, like those of Georgia, are very handsome and beautiful; that they retain the freshness of their complexion till the age of 45 or 50; that they are all very industrious, and often employed in the most laborious offices. These people have preserved uncommon liberties in their laws regarding marriage. If a husband is not pleased with his wife, and makes the first complaint, the seigneur of the district sends for the wife, sells her, and provides the husband with another. The wife, if she

* See Struys, tom. 2. p. 75.

she makes the first complaint, enjoys the same privilege*.

The Mingrelians, according to the relations of travellers, are as handsome and beautiful as the Georgians or Circassians, and they seem to be the same race of people. 'In Mingrelia,' says Chardin, 'there are women extremely 'handsome, of a majestic air, whose form and 'visage are enchanting, and their aspect attracts 'every beholder. Those who are less handsome, 'or advanced in years, daub their eye-brows, 'cheeks, forehead, nose, and chin, with coarse 'paint. Others only paint their eye-brows, and 'bestow much attention to their dress, which is 'similar to that of the Persians. They wear a 'veil, which covers only the crown and back 'part of the head. Though lively, civil, and 'affectionate, they are extremely perfidious; and 'there is no wickedness which they will not 'perpetrate, in order to procure, to preserve, or 'to get rid of their gallants. The men have 'likewise many bad qualities. They are all 'trained to robbery, which they study both as a 'business and an amusement. They relate, with 'extreme satisfaction, the depredations they have 'committed, and derive from this polluted 'source their greatest praise and honour. In 'Mingrelia, falsehood, assassination, and theft, 'are good actions, and whoredom, bigamy, and 'incest, are virtuous habits. A man marries

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* See Tavernier, tom. i. p. 469.

‘two or three wives at a time, and keeps as many
 ‘concubines as he chuses. Husbands in this
 ‘country, are not jealous of their wives; and,
 ‘when a wife is detected in the act of infidelity,
 ‘he has only a right to demand a pig from the
 ‘gallant, who generally eats a share of it in com-
 ‘pany with the husband and wife. To have
 ‘many wives and concubines, they pretend to
 ‘be a good and laudable practice, because it en-
 ‘ables them to beget the more children, whom
 ‘they sell for gold, or exchange for wares and
 ‘provisions*.’ The Mingrelian slaves are not
 dear. A man, from 25 to 40 years, may be pur-
 chased for 15 crowns; and, when farther ad-
 vanced, for 8 or 10. The finest girls, from 13
 to 18, cost only 20 crowns, a woman about 12
 crowns, and children only 3 or 4.†.

The Turks, who purchase vast numbers of
 these slaves, are so blended with Armenians,
 Georgians, Arabians, Egyptians, and even with
 the Europeans, that it is impossible to distinguish
 the real natives of Asia Minor, Syria, and the
 rest of Turkey. In general, the Turks are ro-
 bust, and tolerably well made‡; and crooked
 or deformed persons are rarely to be met with
 among them. Most of their women are like-
 wise handsome and beautiful: They are also
 very fair, because they seldom go abroad, and
 never without being covered with a veil ||.

‘There

* Chardin, p. 77.
 tom. 1. p. 55.

† Ibid. p. 105.
 || Ibid. tom. 1. p. 105.

‡ Thevenot,

"There is not," says Belon, "a woman in
 Asia, however mean her condition, who has
 not a complexion fresh as a rose, and whose
 skin is not fair, delicate, and smooth as velvet:
 They make an unguent of Chian earth, with
 which they anoint their whole bodies before
 they go to bathe. Some likewise paint the
 eye-brows of a black colour; while others e-
 radicate the hairs with rufina, and paint artifi-
 cial eye-brows in the form of a black crescent,
 which have a beautiful appearance at a distance,
 but are very ugly when viewed more closely.
 This custom, however, is extremely antient*.
 He adds, that, in Turkey, neither men nor wo-
 men wear hair on any part of the body, except-
 ing the head and chin; that they make an oint-
 ment, composed of equal quantities of rufina
 and quick-lime, diluted in water, which they
 apply before they enter the warm bath; that,
 when they begin to sweat in the bath, the hairs
 fall off by simple rubbing with the hand, and
 the skin remains soft and smooth, without the
 least vestige of hair on it †: He farther remarks,
 that, in Egypt, there is a shrub called *alcanna*,
 the leaves of which, when dried and pounded,
 make a yellow or reddish paint, and with which
 the Turkish women tinge their hands, feet, and
 hair. With the same substance they paint the
 hair of their children, and the manes of their
 horses ‡.

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* Observ. de Pierre Belon, p. 199.

† Ibid. p. 198.

‡ Ibid. p. 136.

The women of Turkey likewise use a preparation of tutty to render their eyes of a deeper black. They bathe often, use perfumes, and employ every art to preserve and improve their beauty. The Persian women are said to be still more anxious on this subject than the Turks. The men have also different tastes with regard to beauty; the Persians are fond of brown complexions, and the Turks prefer the red *.

It has been alledged, that the Jews, who came originally from Syria and Palestine, still preserve their former darkness of complexion. But, as is properly remarked by Misson, the Jews of Portugal alone are tawny, because, by constantly marrying those of their own tribe, the children of these people always resemble their parents, and the tawny colour is thus perpetuated, with little diminution, even in the northern countries. The Jews of Germany, however, as those of Prague, for example, are not more swarthy than the other inhabitants of Germany †.

The present natives of Judea resemble the other Turks; only they are more swarthy than those who live in Constantinople, or on the coasts of the Black Sea; in the same manner as the Arabians are browner than the Syrians, because they inhabit a more southern climate.

The same observation applies to the Greeks; the inhabitants of the north are fairer than those of

* See Voyage de la Boulaie, p. 110.

† Voyages de Misson, tom. 2. p. 225.

of the islands or of the southern provinces. In general, the great women are still more beautiful and vivacious than the Turks. They have likewise the advantage of enjoying a greater degree of liberty. Gemelli Carreri informs us, that the women of the island of Chio are fair, beautiful, lively, and very familiar with the men; that the young girls see strangers without restraint; and that they all go with their necks uncovered*. He likewise remarks, that the Greek women, especially in the neighbourhood of Constantinople, have extremely fine hair; but that those whose hair descends to their heels are less regular in their features†.

The Greeks esteem large eyes and high eyebrows as great points of beauty in either sex‡; and, it is worthy of remark, that, in all the busts and medals of the antient Greeks, the eyes are much larger than in those of the antient Romans.

The inhabitants of the Archipelago are remarkably fine swimmers and divers. Thevenot tells us, that they exercise themselves in bringing up sponges, and even lost goods, from the bottom of the sea; and that, in the island of Samos, a young man cannot obtain a wife, unless he be able to dive at least eight §, or, according

* Voyages de Gemelli Carreri, tom. 1. p. 110.
tom. 1. p. 363.

† Observ. de Belon, p. 200.

‡ Id.

§ The-

venot, tom. 4. p. 206.

ding to Dapper, 20 fathoms *. The latter adds, that, in some of the islands, as that of Nicaria, they have a strange practice of conversing with each other at great distances; and that their voices are so strong, that, at the distance of a quarter of a league, and sometimes of a whole league, those islanders can maintain a conversation, which is necessarily interrupted by long intervals, the answer not arriving for several seconds after the question.

The Greeks, the Neapolitans, the Sicilians, the Corsicans, the Sardinians, and the Spaniards, being situated nearly under the same latitude, are very similar in their complexions. All these people are more swarthy than the French, the British, the Germans, the Polanders, the Moldavians, the Circassians, and all the other inhabitants of the northern parts of Europe, till we advance to Lapland, where, as formerly remarked, we meet with another race of men. In travelling through Spain, a difference of colour is perceptible even at Bayonne; there the complexion of the women is browner, and their eyes are more brilliant †.

The Spaniards, though meagre, are handsome. Their features are regular, their eyes beautiful, and their teeth well arranged: But their complexion is yellow and swarthy. Their children are born fair and beautiful; but, as they grow up,

* Description des îles de l'Archipel. par Dapper, p. 163.

† Relation du voyage d'Espagne, p. 4.

up, their colour changes in a surprising manner: The operation of the air and of the sun soon renders them so yellow and tawny, that a Spaniard is easily distinguished from a native of any other country in Europe *. In some provinces of Spain, as in the environs of the river Bidassoa, it has been remarked, that the inhabitants have ears of an uncommon size †.

Black or brown hair begins to be unfrequent in Britain, in Flanders, in Holland, and in the northern provinces of Germany; and in Denmark, Sweden, and Poland, it is seldom to be met with. Linnaeus informs us, that the Goths are tall; that their hair is straight, and as white as silver; and that the iris of their eye is blueish: 'Gothi corpore procetiore, capillis albidis rectis, oculorum iridibus cinereo-coerulescentibus.' The Findlanders, he adds, are muscular and fleshy; their hair is long, and of a whitish yellow colour; and the iris of the eye is of a deep yellow: 'Fennones corpore toroso, capillis flavis prolaxis, oculorum iridibus fuscis ‡.'

The women of Sweden are very prolific. Rudbeck says, that they generally bring forth 8, 10, or 12 children; and that 18, 20, 24, and even 30, are not uncommon. He adds, that the men often exceed the age of 100 years; that some arrive at 140; and that one Swede lived 156, and another 161 years ||. But this author,

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* Ibid. p. 187.

† Ibid. p. 326.

‡ See Linnaei

Faunam Suecicam, p. 1.

| See Olaii Rudbeckii Atlantica.

it must be allowed, is an enthusiast with regard to his country ; and, in his estimation, Sweden is the best country in the world. This extraordinary fertility in the Swedish women implies not an uncommon propensity to love. Mankind are more chaste in cold than in hot climates. Though the women of Sweden are less amorous than those of Spain or Portugal, yet they bring forth more children. The northern nations, it is well known, have over-run all Europe to such a degree, that historians have distinguished the North by the appellation of ' *Officina Gentium*.'

The author of the ' *Historical Voyages of Europe*,' agrees with Rudbeck, that the Swedes live longer than any other people of Europe ; and adds, that he saw several men who, he was assured, had exceeded their 150th year *. This longevity of the Swedes he ascribes to the salubrity of the air. He makes the same remark with regard to Denmark : The Danes, he says, are tall and robust, of a lively and florid complexion, and, on account of the salubrity of the air they respire, live very long : The Danish women are also fair, handsome, and extremely prolific †.

Previous to the reign of the Czar Peter I. the Russians, we are told, were almost entirely barbarous. Born in slavery, they were ignorant, brutal, cruel, and had neither courage nor man-
ners.

* See les Voyages historiques de l'Europe, tom. 8. p. 229.

† Ibid. tom. 8. p. 279.

ners. Men and women often bathed promiscuously in baths heated to a degree that would have been insupportable to any other people; and, like the Laplanders, immediately after coming out of these hot baths, they plunged themselves into cold water. Their food was extremely coarse. Cucumbers or melons, which they brought from Astracan, and preserved during the summer in a mixture of water, flour, and salt, were their favourite dishes *. Some absurd scruples prevented them from eating particular meats, as pigeons and veal. But, even at this unrefined period, the women knew the arts of colouring their cheeks, pulling out their eye-brows, and painting artificial ones. They also adorned themselves with jewels and pearls, and their garments were made of valuable stuffs. Is it not apparent, from these circumstances, that the barbarity of the Russians had already begun to decay, and that their sovereign had not such amazing difficulties in polishing them, as some authors are desirous of insinuating? They are now a civilized and commercial people; they are fond of the arts and sciences, of public spectacles, and of ingenious novelties. Such important changes cannot be produced by a great man; but a great man may be born in a fortunate moment.

It has been alledged by some authors, that the air of Muscovy is so salubrious as to prevent the

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* See la relation curieuse de Moscovie, p. 181.

existence of pestilential contagion. It is recorded, however, in their own annals, that, in the 1421, and during the six subsequent years, the Muscovites were so dreadfully afflicted with contagious distempers, that the constitution of their descendants suffered a considerable change. Before that aera, many men lived above 100 years; but very few now arrive at that age*.

The Ingrians and Carelians, who inhabit the northern provinces of Muscovy, and are the natives of the country round Petersburg, have vigorous and robust constitutions. Most of them have white or fair hair†. They resemble the Findlanders, and speak the same language, which has no affinity to any of the other European tongues.

From the above historical account of all the inhabitants of Europe and Asia, it is apparent, that the differences in colour depend much, though not entirely, upon the climates. There are many other causes which have an influence upon the colour, and even upon the features and corporeal form of different people. The nature of the food is one of the principal causes; and we shall afterwards consider the changes it may produce. Manners, or the mode of living, may also have considerable effects. A polished people, who are accustomed to an easy, regular, and tranquil mode of life, and who, by the vigilance

* See le voyage d'un Ambassadeur de l'Empereur Leopold au Czar Michaëlowits, p. 220.

† See les Nouveaux Memoires sur l'etat de la Grand Russie, tom. 2, p. 64.

of a wise government, are removed from the dread of oppression and misery, will, for these reasons alone, be more strong, vigorous, and handsome, than savage and lawless nations, where every individual, deriving no succours from society, is obliged to provide for his own subsistence, to suffer alternately the pangs arising from hunger and from surfeits of unwholesome food, to sink under the fatigues of hard labour, to feel the rigours of a severe climate, without possessing the means of alleviating them, to act, in a word, more frequently like a brute than a man. Supposing two nations, thus differently circumstanced, to live under the same climate, it is reasonable to think, that the savage people would be more ugly, more tawny, more diminutive, and more wrinkled, than the nation that enjoyed the advantages of society and civilization. If the former had any superiority over the latter, it would consist in the strength, or rather in the hardness of their bodies. Among the savage people, there might likewise be fewer examples of lameness, and of other bodily impediments or deformities. Such men can live, and even multiply, in a polished state, where each individual contributes to the support of his neighbour, where the strong injure not the feeble, and where the qualities of the body are less esteemed than those of the mind. But, among a savage people, as every individual must subsist and defend himself by corporeal strength and address alone, those

those who unfortunately come into the world with deformed bodies, or feeble constitutions, fall early victims to the defects of nature.

Three causes, therefore, must be admitted, as concurring in the production of those varieties which we have remarked among the different nations of this earth: 1. The influence of climate; 2. Food, which has a great dependence on climate; and, 3. Manners, on which climate has, perhaps, a still greater influence. But, before we attempt to establish this opinion by reasoning, it is necessary to give as minute a description of the inhabitants of Africa and America, as we have already given of those of Europe and Asia.

We have already mentioned the different nations who inhabit the northern part of Africa, from the Mediterranean to the Tropic. All those beyond the Tropic, from the Red Sea to the Ocean, an extent of country about 100 or 150 leagues wide, are a species of Moors, though so swarthy, that they appear to be almost black. The men, in particular, are exceedingly brown; the women are a little fairer, well-made, and tolerably beautiful. Among those Moors, there is a vast number of Mulattoes, who are of a still deeper black; because they are born of Negroe women whom the Moors purchase, and with whom they have many children*. Beyond this territory, under the 17th or 18th degree

* See Marmol, tom. 3. p. 29. 33.

gree of north latitude, we find the Negroes of Senegal and of Nubia, both on the coast of the western ocean and that of the Red Sea; and then, from the 18th degree of north to the 18th of south latitude, the whole inhabitants of Africa, excepting the Ethiopians or Abyssinians, are perfectly black. Thus the portion of the globe allotted by Nature to this race of men, contains an extent of territory parallel to the Equator, of about 900 leagues in breadth, and considerably more in length, especially northward of the Equinoctial line. But, beyond the 18th or 20th degree of south latitude, the natives are no longer Negroes, as shall be evinced when we describe the Caffres and Hottentots.

We have long been deceived with regard to the colour and features of the Ethiopians, because they have been confounded with their neighbours the Nubians, who are a different race of people. Marmol tells us, that the Ethiopians are perfectly black, and that they have large faces and flat noses*; and the Dutch travellers give the same description of these people†. The truth, however, is, that the Ethiopians differ from the Nubians both in colour and features. The natural colour of the Ethiopians is brown or olive, like that of the southern Arabs, from whom they probably derive their origin. They are tall, and have regular features, fine eyes, well

* Marmol, tom. 3. p. 68.
Comp. des Indes de Holl. tom. 4. p. 33.

† Recueil des voy. de la

well proportioned noses, thin lips, and white teeth. But the Nubians have flat noses, thick prominent lips, and their visages are extremely black *. These Nubians, like their western neighbours, are a species of Negroes, very similar to those of Senegal.

The Ethiopians are a half polished people. They wear garments of cotton and of silk. Their houses are low and ill built. In the culture of their lands they are extremely negligent; because the citizens and common people are despised, oppressed, and plundered by the nobles. Each of these classes live separate from each other in their own villages or hamlets. Their country produces no salt, and the people purchase it for an equal weight of gold. They are fond of crude meat; and, in their feasts, the second course, which they regard as the most delicate, consists of flesh entirely raw. Though they have vines, they make no wine; and their only beverage is a sour composition of tamarinds and water. They travel on horses, and use mules for transporting their merchandize. Their knowledge of the arts and sciences is extremely limited; for their language is without rule, and their manner of writing is so imperfect, that they require several days to write an epistle, though their characters are more beautiful than those of the Arabians †. Their mode of salutation is singular:
They

* Lettres edifiantes, Recueil 4. p. 349.

† See Voyages de la Comp. de Holl. tom. 4. p. 34.

They take one another by the right hand, and mutually apply it to their mouths; the saluter then takes off the scarf of the person he salutes, and wraps it round his own body, by which the other is left half naked; for most of the Ethiopians wear only this scarf and a pair of cotton drawers †.

Admiral Drake, in his voyage round the world, mentions a fact, which, though singular, appears not to be incredible. On the frontiers of the desert of Ethiopia, he remarks, there are men called *Acridophagi*, or locust-eaters, who are black, meagre, extremely nimble, and of small stature. In the spring-season, infinite numbers of locust are transported into their country by certain hot winds which blow from the west. Having neither cattle nor fish, they are obliged to live upon these locusts, which they amass in vast quantities: They cure them with salt, and preserve them for food during the whole year. This wretched nourishment produces very strange effects: The people hardly reach the age of 40 years; and, when they approach to this period of life, winged insects ‡ are engendered under their skin, which at first create a violent itching, and soon multiply so amazingly that their whole flesh swarms with them. They begin with devouring the belly, then the breast, and proceed in their ravages till they eat the whole flesh from the bones. Thus are those men, whom
nature

† Lettres edifiantes, recueil 4. p. 349.

‡ The author, instead of winged insects, should have said caterpillars.

nature forces to feed upon insects, devoured in their turn by them. If this fact were well attested, it would afford ample scope for reflection.

In Ethiopia, and in that tract of land which stretches to Cape Gardufu, there are vast deserts. This country, which may be regarded as the most easterly part of Ethiopia, is almost entirely uninhabited. To the south, Ethiopia is bounded by the Bedwins, and some other nations, who observe the Mahometan law; a circumstance which corroborates the opinion, that the Ethiopians have originated from the Arabians. These two people are only separated by the Straits of Babelmandel. It is probable, therefore, that the Arabians had formerly invaded Ethiopia, and obliged the natives of that country to retire to the northern parts of Nubia. The Arabians have even spread themselves along the coasts of Melinda; for the inhabitants of those coasts are only tawny, and follow the religion of Mahomet*. Even in Zanguebar, the natives are not black; most of them speak the Arabic language; and they wear cotton stuffs. This country, though under the Torrid Zone, is not excessively hot; and the hair of the natives is black and crisped like that of the Negroes†. Upon the whole of this coast, as well as at Mosambique and Madagascar, we meet with some white men, who, it is alledged, came originally from China, and settled there, when the Chinese were accustomed

* See Pigafetta, p. 56.

† Marmol, p. 107.

stomed to sail over all the eastern seas, in the same manner as they are now navigated by the Europeans. Though this opinion be problematical, it is certain, that the nations of this eastern coast of Africa are black, and that the tawny or white people found there have come from other countries.

But, to form a just idea of the varieties which occur among these black nations, requires a more minute examination.

From comparing the testimonies of travellers, it, in the first place, appears, that the varieties among the blacks are equally numerous as those among the whites. The blacks, as well as the whites, have their Tartars and their Circassians. The natives of Guiney are extremely ugly, and have an insufferable odour: Those of Sofala and of Mosambique are beautiful, and have no bad smell. It is, therefore, necessary to divide the blacks into different races; and, I think, they may be reduced to two principal races, that of the Negroes, and that of the Caffres. Under the first I comprehend the blacks of Nubia, of Senegal, of Cape Verd, of Gambia, of Sierra-leona, of the Teeth and Gold Coasts, of that of Juda, Benin, Gabon, Loango, Congo, Angola, and of Benguela, as far as Cape Negro. Under the second, I include all the nations from Cape Negro to the point of Africa, where they assume the name of *Hottentots*, and all those on the eastern coast, within the same latitude, as the territories

tories of Natal, of Sofala, of Monomotapa, of Mosambique, of Melinda: The blacks of Madagascar and of the neighbouring islands are likewise Caffres, and not Negroes. These two races of men have a greater resemblance to each other in colour than in their features, hair, skin, or smell: Their manners and natural dispositions are likewise very different.

On a closer examination of the different people of which each of these races consist, we shall find as many varieties among the blacks as among the whites, and an equal number of shades from brown to black, as we have found from brown to white in the other race.

We shall begin with the countries to the north of Senegal, and, proceeding along the coasts, we shall consider the different nations which have been recognised and described by travellers. In the first place, it is certain, that the natives of the Canary islands are not Negroes; for we are assured by voyagers, that the antient inhabitants of these islands were tall, well made, and of a vigorous complexion; that the women were beautiful, and had fine hair; and that the inhabitants of the southern parts of each island were more olive than those on the northern parts *. Duret, in the history of his voyage to Lima †, informs us, that the antient inhabitants of the island of Teneriff were tall and robust, but
meagre

* See l'histoire de la premiere decouverte des Canaries, par Bontier et Verriere, p. 251.

† Page 72.

meagre and tawny, and that most of them had flat noses *. These people, we see, had nothing in common with the Negroes, excepting the flat nose. The natives of Africa, in the same latitude with these islands, are Moors, and very tawny; but, like the islanders, they evidently belong to the race of whites.

The inhabitants of Cape Blanc are Moors, and follow the religion of Mahomet. Like the Arabs, they wander about from place to place, pasturing their horses, camels, oxen, goats, and sheep. They trade with the negroes, who give them eight or ten slaves for a horse, and two or three for a camel †. It is from these Moors that we have the gum Arabic, which they dissolve among their milk. They seldom eat flesh, and never kill their cattle, but when they are about to die of old age or disease ‡.

The Moors are separated from the Negroes by the river Senegal. They are only tawny, and live on the north side of this river; but the Negroes who inhabit the south side of it are absolutely black. The Moors wander through the country; but the Negroes are sedentary, and dwell in villages. The former are free and independent; the latter are the slaves of tyrants, who oppress them. The Moors are small, meagre, and have a pusillanimous aspect; but they are sly and ingenious. The Negroes, on the

* Hist. gen. des. voyages, par M. l'Abbé Prevot, tom. 2. p. 230. † Voyage du le Maire. p. 46. ‡ Ibid. p. 66.

the contrary, are large, plump, and well made; but they are simple and stupid. In fine, the country inhabited by the Moors consists of barren sands, where verdure appears only in very few places. But the Negro country is rich, fertile in pastures, and produces millet, and trees which are always green, but few of them bear fruit fit for food.

In some places, both on the north and south of the river Senegal, there is a species of men called *Foulies*, who seem to form the shade between the Moors and Negroes, and who are, perhaps, Mulattoes, produced by a mixture of the two nations. These *Foulies* are not entirely black, like the Negroes; but they are much browner than the Moors, and hold the middle rank between the two. They are likewise more advanced in civilization than the Negroes; they follow the religion of Mahomet, and are hospitable to strangers*.

The Cape de Verd islands are peopled with Mulattoes, sprung from the Portuguese who first settled there, and the Negroes whom they found on these islands. They are called *Copper-coloured Negroes*, because, though they resemble the Negroes in their features, they are less black, or rather yellowish. They are handsome and ingenious; but extremely indolent and idle. They live chiefly by hunting and fishing. They train their dogs to kill the wild goats, with
which

* Voyage du le Maire, p. 75. Marmol, tom. 1. p. 34.

which the islands abound. They deliver their wives and daughters to the embraces of strangers, if they chuse to pay for this singular favour. For pins and other trifles, they sell parquets, porcelain-shells, ambergris *, &c.

The first genuine Negroes we meet with, are those on the southern banks of the Senegal. These people, as well as those who inhabit the country comprehended between this river and that of Gambia, call themselves *Jaloffs*. They are very black, handsome, of a fine stature, and their features are not so disagreeable as those of the other Negroes. Some of them, and particularly the women, have very regular features. They have the same ideas of beauty with the Europeans; for they are fond of fine eyes, a small mouth, thin lips, and a well proportioned nose; they differ only with regard to the basis of the picture, a very black shining colour being absolutely necessary to form a beauty: Their skin is very fine and soft; and, abstracting from colour, they have as beautiful women as are to be met with in any other country in the world; their females are generally handsome, gay, active, and extremely amorous: They are peculiarly fond of white men, whom they care for with ardour, both to satisfy themselves, and in hopes of obtaining presents. In their attachment to strangers, they meet with no restraint from their husbands. But, though they offer
their

* See les voyages de Roberts, p. 387. Struys, tom. 1. p. 11. Biervillas, p. 15.

their wives, daughters, and sisters to strangers, and conceive their honour to be injured by a refusal, their jealousy rises to such a pitch, when their wives transgress with men of their own nation, that they often beat, and even cut themselves with sabres. Those women, notwithstanding, have the tobacco-pipe perpetually in their mouths, and their skin, when they are heated, has a disagreeable smell, though it is not so strong as that of the other Negroes. They love dancing to the sound of the drum and calabash. All their movements in these dances consist of lascivious and indecent postures. They bathe often; and file their teeth, in order to render them more equal. Most of the young girls engrave figures of animals, flowers, &c. on their skin.

It is a general practice among the Negroe women, when travelling, to carry their children on their backs. Some have ascribed the flat nose and big bellies of the Negroes to this cause: The mother, in raising the child by sudden jerks, makes the child's nose strike against her back; and the child, to avoid these frequent blows, keeps its head as far back as possible, by pushing its belly forward *. Their hair is black and crisped, like curled wool. It is by the hair and the colour that they chiefly differ from other men; for their features are not, perhaps, so different

* See le Maire, p. 144. Le Père du Jaric, p. 364. et le Père du Tertre, p. 493.

ferent from those of the Europeans, as the Tartarian visage differs from that of a Frenchman. Father Tertre affirms, that, if most of the Negroes are flat nosed, it is owing to a general practice of the mothers, who depress the noses of their children as soon as they come into the world, and squeeze their lips to make them thick; and that those children, who chance to escape these operations, have elevated noses, thin lips, and as fine features as the Europeans. This remark, however, is only applicable to the Negroes of Senegal, who are the most handsome and most beautiful of all the race. Among all the other Negroes, flat noses and thick lips seem to be features bestowed on them by nature; These, instead of deformities, are regarded as marks of beauty, and supplied by art, when they happen to be denied by nature.

The Negroe women are extremely prolific: They bring forth their children with great ease, and require no assistance. Their labours are followed by no troublesome consequences; for their strength is fully restored by a day, or, at most, two days repose. They make excellent nurses, and manage their children with great tenderness and affection. They are also more lively and alert than the men; and they even cultivate the virtues of discretion and temperance. Father Jaric informs us, that the Jaloff Negroe women, in order to accustom themselves to eat and speak little, fill their mouths with water in
the

the morning, and keep it there till the hour of breakfast*.

The Negroes of the island of Goree, and of the Cape de Verd coast, like those on the banks of the Senegal, are well made, and extremely black. They are so fond of a black shining complexion, that they despise such as want this perfection, in the same manner as tawny men are despised by the Europeans. Though strong and robust, they are exceedingly indolent, and cultivate neither corn, wines, nor fruits. Fish and millet are their chief articles of food; and they seldom eat flesh. They compare the Europeans to horses, because they eat herbs. But they are so passionately fond of spirits, that they sell their children, their parents, and even themselves, for brandy†. They go almost naked, having only a cotton garment which covers them from the middle to about one half of the thigh; and they alledge, that the heat of the climate permits them not to wear any more‡. Their poverty and bad cheer, however, hinder them not from being both fat and contented. They believe their country to be the finest in the universe; and that they are the handsomest men in the world, because they are the blackest: If their women betrayed no attachment to the white men, their colour would give them no uneasiness.

Though

* See l'Hist. par Père du Jaric, part 3. p. 365.

† See le Voy. de M. de Gennes, p. 15.
édifiantes, recueil 11. p. 48.

‡ Lettres

Though the Negroes of Sierra-leona be not altogether so black as those of Senegal, they are not, however, as Struys alledges*, of a reddish or tawny colour. Like the Guiney Negroes, they are of a black less deep than the natives of Senegal. The general custom, among the Negroes of Guiney and Sierra-leona, of painting their bodies with red and other colours, might deceive Struys. They likewise paint a ring round their eyes with white, yellow, or red, and make rays of different colours upon their faces; and many of them cut, upon their skin, figures of plants and of animals. Their women are still more debauched than those of Senegal. Many of them are common prostitutes, without incurring the smallest dishonour. Both men and women keep their heads uncovered; and they shave or cut their hair, which is very short, in various modes. They wear ear-rings made of teeth, shells, horns, bits of wood, &c. which weigh three or four ounces. Some of them pierce their nostrils or their upper lip, for the purpose of suspending similar ornaments. Their garments consist of a kind of apron made of the bark of a tree, covered with apes skins; and to these skins they fix small bells. They sleep upon bull-rush mats; they eat fish, or flesh, when they can procure it; but yams and banana's are their principal food†. They

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have

* Tom. 1. p. 22.

† See *Indiæ Orient. part 2. in qua Johannis Hugonis Linsteotani &c. navigatio*, p. 11.

have no passion, but for their women, and no inclination to activity or labour. Their houses are wretched huts. They often continue to live in wild and barren places, though in the neighbourhood of rich valleys, hills covered with trees, green and fertile fields, intersected, in the most delightful manner, with rivers and brooks. But their indolence and stupidity make them insensible to every pleasure of this nature. The roads which lead from one place to another are generally twice as long as they ought; but they attempt not to render them shorter; and, though the means were pointed out to them, they never think of taking the shortest road, but mechanically follow the beaten track, and are not anxious about losing time, which they have no mode of measuring.

Though the Guiney Negroes enjoy good health, and have vigorous constitutions, they seldom reach old age. A Negro of 50 years is a very old man. Their premature commerce with the women is, perhaps, the cause of the brevity of their lives. Their children, when very young, are allowed to commit every species of debauchery*; and nothing is so rare among these people as to find a girl who can remember the time when she ceased to be a virgin.

The islands of St Thomas, of Annobona, &c. are inhabited by Negroes similar to those on the
neigh-

* See le Voy. de Guinée par Guill. Bosman, p. 143.

neighbouring continent; but their numbers are few; because the Europeans have chased them off, and retained only such as they reduced to slavery. Both men and women go naked, excepting a small apron round their middle*. Mandellso alledges that the Europeans who settle in the island of St Thomas, which is but a degree and a half from the Equator, preserve their whiteness till the third generation; and he seems to insinuate that they turn black after that period. But it is not probable that this change can be so suddenly effected.

The Negroes on the coasts of Juda and Arada, are less black than those of Senegal, Guiney, and Congo. They prefer the flesh of dogs to all other meat, a roasted dog being generally the first dish presented at their feasts. This taste is not peculiar to the Negroes; the savages of North America, and some Tartarian nations are equally fond of dogs flesh. The Tartars are even said to castrate dogs, in order to fatten them and improve their flesh†.

Pigafetta, and Drake who seems to copy him verbatim, inform us, that the Negroes of Congo are black, but less so than those of Senegal. Their hair is generally black and crisped, though in some it is red. The men are of a middle stature; in some, the eyes are brown; in others, they are of a sea-green colour. Their lips are
not

* Pyrard, p. 16.
p. 165,

† Nouveaux Voy. des isles, tom. 4.

not so thick as those of the other Negroes; and their features very much resemble those of the Europeans *.

In certain provinces of Congo, they have very singular customs. When a person dies in Loango, for example, they place the corpse on a kind of amphitheatre, raised about six feet above the ground, and in a sitting posture, with the hands resting on the knees. They dress him in his best garments, and then kindle fires all round the body. In proportion as the cloaths absorb the moisture, they cover him with fresh garments, till the body be perfectly dry; after which, they bury him with great pomp. In the province of Malimba, the wife ennobles the husband. When the King dies, and leaves only a single daughter, if she has arrived at the age of puberty, she becomes absolute mistress of the kingdom. She begins her reign by making a tour round her dominions. In all the towns and villages through which she passes, the whole men are obliged to appear before her, immediately upon her arrival, and she chooses the man whom she fancies most to pass the night with her. At her return from her journey, she sends for the man who has been so fortunate as to please her best, and instantly marries him. After marriage, her power terminates, and devolves entirely on her husband. These facts I have extracted

* See *Indiae Orient. part. 1. p. 5.* and *Drake's Voyage, p. 110.*

tracted from M. de la Brosse's travels along the coast of Angola in the year 1738. He adds a fact not less singular. 'These Negroes,' says he, 'are extremely vindictive, of which I shall give a convincing proof. They daily demanded of us some brandy for the use of the King and chief men of the town. One day this request was denied, and we had soon reason to repent it; for all the French and English officers having gone a fishing on a small lake near the sea-coast, they erected a tent for the purpose of dressing and eating the fish they had caught. When they were amusing themselves after their repast, seven or eight Negroes, who were the chiefs of Loango, arrived in sedans, and presented their hands, according to the custom of the country. These Negroes privately rubbed the officers hands with a subtle poison, which acts instantaneously; and, accordingly, five Captains, and three surgeons, died on the spot,' &c.

When the Negroes of Congo have a pain in their head, or any other place of the body, they make a small wound in the place affected, and apply to it a small horn with a hole in its middle, by means of which they suck out the blood till the pain abates*.

The Negroes of Senegal, of Gambia, of Cape de Verd, of Angola, and of Congo, are of a finer black than those of the coasts of Juda, Ifsigni,

* Pigafetta, p. 51.

signi, Arada, and the adjacent provinces. When in health, they are all black; but, when sick, they become yellowish, or copper-coloured *. In the French islands, the Negroes of Angola are preferred, for their strength, to those of Cape de Verd: But, when heated, they smell so rank, that the places they pass through are infected with the stench for more than a quarter of an hour. The Cape de Verd Negroes do not smell nearly so strong as those of Angola: They have also a finer and blacker skin; they are better made; their features are softer; their dispositions are more gentle; and their stature is more commodious †. The Negroes of Guiney are very proper for cultivating the ground and other laborious offices. Those of Senegal are not so strong; but they are more ingenious, and better adapted for domestic services ‡. Father Charlevoix tells us, that the Senegal Negroes are the most handsome, most docile, and best suited for domestic uses; that the Bambaras are larger, but that they are all rogues; that the Aradas are best acquainted with the culture of the earth; that the Congos are the smallest in size, and excellent fishers, but that they are much addicted to desertion; that the Nagos are the most humane, the Mondongos the most cruel, the Mimmes the most resolute, most capricious, and most subject to despair; and that the Creole Negroes,

from

* Nouveaux voy. aux isles de l'Amerique, tom. 4. p. 138.

† L'hist des Antilles, par le Père du Tertre, p. 493.

‡ Nouveaux voy. aux isles, tom. 4. p. 116.

from whatever nations they derive their origin, retain nothing of their parents but the colour and the spirit of slavery. They are more ingenious, rational, and dexterous, but more slothful and debauched, than the African Negroes. He adds, that the genius of all the Guiney Negroes is extremely limited; that some of them appear to be perfectly stupid, not being able to count beyond the number of three; that they never think spontaneously; that they have no memory, the past and the future being equally unknown to them; that the most sprightly of them have some humour, and make tolerable mimics; that they are extremely cunning, and would rather die than tell a secret; that, in general, they are gentle, humane, docile, simple, credulous, and even superstitious; and that they are faithful, and brave, and, if properly disciplined, would make good soldiers.*

Though the Negroes have little genius, their feelings are extremely acute. According to the manner they are treated, they are gay or melancholy, laborious or slothful, friends or enemies. When well fed, and not maltreated, they are contented, joyous, ready for every employment, and the satisfaction of their mind is painted in their countenance. But, when oppressed and abused, they grow peevish, and often die of melancholy. Of benefits and of abuse, they are exceedingly sensible, and against those who injure

* Hist. de St Dominique, par le Père Charlevoix.

injure them they bear a mortal hatred. On the other hand, when they contract an affection to a master, there is no office, however hazardous, which they will not boldly execute, to demonstrate their zeal and attachment. They are naturally affectionate, and have an ardent love to their children, friends, and countrymen *. (The little they possess they freely distribute among the necessitous, without any other motive than that of pure compassion for the indigent.

Upon the whole, it is apparent, that the unfortunate Negroes are endowed with excellent hearts, and possess the seeds of every human virtue. I cannot write their history, without lamenting their miserable condition. Is it not more than enough to reduce men to slavery, and to oblige them to labour perpetually, without the capacity of acquiring property? To these, is it necessary to add cruelty, and blows, and to abuse them worse than brutes? Humanity revolts against those odious oppressions which result from avarice, and which would have been daily renewed, had not the laws given a friendly check to the brutality of masters, and fixed limits to the sufferings of their slaves. They are forced to labour; and yet the coarsest food is dealt out to them with a sparing hand. They support, say their obdurate task-masters, hunger without inconvenience; a single European meal is sufficient provision to a Negro for three days; however little they eat or sleep, they are always
equally

* Hist. des Antilles, p. 483.

equally strong, and equally fit for labour *. How can men, in whose breasts a single sentiment of humanity remains unextinguished, adopt such detestable maxims? How dare they, by such barbarous and diabolical arguments, attempt to palliate those oppressions which originate solely from their thirst of gold? But, let us abandon those hardened monsters to perpetual infamy, and return to our subject.

Of the inhabitants of the coasts and of the interior parts of Africa, from Cape Negro to Cape de Voltes, an extent of about 400 leagues, we have no knowledge. We only know, that these men are less black than the other Negroes, and that they resemble the Hottentots, with whom they border on the south. The Hottentots, on the contrary, are well known, and described by almost every voyager. They are not Negroes, but Caffres, and would be only of a tawny colour, if they did not blacken their skin with grease and paint. M. Kolbe, who has given a very accurate description of these people, regards them, however, as Negroes. He assures us, that they have all short, black, frizled, woolly hair; and that he never saw a single Hottentot with long hair †. But this circumstance is not sufficient to make us consider them as genuine Negroes. In the first place, their colour is totally different; for M. Kolbe tells us, that they are

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olive,

* Hist. de St Dominique, p. 468.
de Bonne Esperance, par M. Kolbe, p. 95.

† Descript. du Cap

olive, and never black, though they employ every method to darken their skin. In the next place, it seems to be equally difficult to pronounce concerning their hair; for they never either comb or wash it, but daily rub on their heads vast quantities of grease, soot, and dust, which make their hair resemble a fleece of wool stuffed with dirt *. Besides, their dispositions are different from those of the Negroes. The latter are sedentary, love cleanliness, and are easily reconciled to servitude. The Hottentots, on the contrary, are a wandering, independent people, frightfully nasty, and extremely jealous of their liberty. These differences are more than sufficient to convince us that the Hottentots are not of the same race with the Negroes.

Gama, who first doubled the Cape of Good Hope, arrived in the Bay of St Helena on the 4th of November 1497. He describes the inhabitants as being black, of small stature, and having a very disagreeable aspect: But he says not that they were naturally black like the Negroes; and, doubtless, they only seemed black to him by the grease and soot with which they are perpetually covered. This voyager adds, that the sound of their voice resembled sighing; that they were clothed in the skins of beasts; and that their arms were, bludgeons hardened with the fire, and pointed with the horn of some animal †. It is
apparent,

* Descript. du Cap de Bonne Esperance, par. M. Kolbe, p. 92.

† Hist. gen. des Voy. par l'Albé Prevot, tom. 1. p. 22.

apparent, therefore, that the Hottentots practise no arts in common with the Negroes.

We are informed by the Dutch voyagers, that the savages to the north of the Cape are smaller than the Europeans; that their colour is a reddish brown; that they are extremely ugly, and endeavour to increase their blackness with paint; and that their hair resembles that of a man who has hung long on a gibbet *. In another place, they tell us, that the Hottentots are of the colour of Mulattoes; that their visage is greatly deformed; that they are of a middle size, but meagre, and exceedingly nimble in the chace; and that their language resembles the clucking of a Turkey cock †. Father Tachard says, that, though in general their hair be woolly like that of the Negroes; yet many of them have long hair which floats upon their shoulders. He even adds, that some of them are as white as Europeans, but that they blacken their skin with grease and the powder of a certain black stone; and that their women are naturally fair; but, to please their husbands, they paint themselves black ‡. Ovington tells us, that the Hottentots are more tawny than the other Indians; that no people resemble the Negroes more in colour and features, but that they are not so black; and their hair is not so crisped, nor their nose so flat ||.

From

* Voy. de la Comp. de Hollande, p. 218.

Spitsberg, p. 443.

† Voyages de Le premier voy. du Père Tachard,

p. 108.

‡ Voy. d'Ovington, p. 194.

From all these testimonies, it is plain that the Hottentots are not true Negroes, but blacks beginning to approach towards whiteness, as the Moors are whites approaching to blackness. These Hottentots, moreover, are a very singular species of savages. Their women, who are commonly much less than the men, have a kind of excrescence, or hard broad skin, which originates above the os pubis, and descends, like an apron, to the middle of their thighs *. Thevenot says the same thing of the Egyptian women, but that, instead of allowing this excrescence to grow, they burn it off with hot irons. With regard to the women of Egypt, the fact is very doubtful. But it is certain, that all the women who are natives of the Cape are subject to this monstrous deformity, which they uncover to those who have the curiosity to look at it. The men are all half eunuchs, not naturally, but by an absurd custom of cutting out one of the testicles about the age of eight years. M. Kolbe saw this operation performed on a young Hottentot. The circumstances with which this ceremony is accompanied are so singular that they deserve to be recited.

After rubbing the young man with grease taken from the entrails of a sheep which is slain for the purpose, they lay him on his back on the ground, tie his hands and his feet, and three or four of his friends hold him. Then the priest, (for

* See Descript. du Cap. par. M. Kolbe, tom. 1. p. 91, and voyage de Courlai, p. 291.

(for it is a religious rite), armed with a sharp knife, makes an incision, and cuts away the left testicle *, and puts in its place a ball of grease of the same size, prepared with some medicinal herbs. He then sews up the wound with the bone of a small bird, which serves for a needle, and a thread made of the tendon of a sheep. The operation being thus finished, the patient is untied. But the priest, before quitting him, rubs him all over with the warm grease of a new-killed sheep, or rather pours the grease upon him so copiously, that, when cool, it forms a kind of crust. At the same time, he rubs him so roughly, that the young man, who has already suffered too much, is covered with sweat, and fumes like a capon on a spit. The operator next makes furrows with his nails in this crust of grease, from one end of the body to another, and then pisses in them. After which, he again rubs the patient, and fills up the furrows with fresh grease. The young man is now instantly abandoned, and left alone in a condition rather resembling death than life: He is obliged to crawl, in the best manner he can, into a hut purposely erected near the place where the operation is performed. There he either perishes or recovers, without assistance, or any other nourishment than the grease that covers him, and which he may lick, if he chuses. At the end of two days, he generally recovers, comes out of his

* Tavernier says it is the right, tom. 4. p. 297.

his hut, and presents himself to his friends : And to prove that he is perfectly cured, he runs before them with the swiftness of a stag *.

All the Hottentots have broad flat noses, which would not be the case, if their mothers did not flatten them immediately after birth ; for they regard a prominent nose as a great deformity. They have also very thick lips, white teeth, bushy eye-brows, large heads, meagre bodies, and small limbs. They seldom live above 40 years. The short duration of their lives is unquestionably occasioned by the nastiness in which they perpetually wallow, and the putrid flesh on which they chiefly feed. As most travellers have written fully concerning the manners of this dirty people †, I shall only add one fact more, which is related by Tavernier. The Dutch, says he, carried off a Hottentot girl a few days after her birth, brought her up among themselves, and she soon became as white as any European. From this fact, he concludes, that all the Hottentots would be equally fair, if they did not perpetually daub themselves with dirt and black paints.

Along the African coast, beyond the Cape of Good Hope, we meet with the territory of Natal,
the

* Descript. du Cap par M. Kolbe, p. 275. † The reader may consult the following voyagers : Kolbe ; voy. de la Comp. Holl. ; Robert Lade, tom. 1. p. 88 ; Ovington ; Loubere, tom. 2. p. 134. Tachard, p. 95. Biervillas, part. 1. p. 34. Tavernier, tom. 4. p. 296. François Leguat, tom. 2. p. 154. Dampier, tom. 2. p. 255, &c.

the inhabitants of which differ greatly from the Hottentots. They are better made, and less ugly. They are likewise naturally blacker; their visage is oval, their nose well proportioned, and their teeth are white; their aspect is agreeable, and their hair is naturally crisped. But, like the Hottentots, they have some taste for grease; for they wear bonnets made of the tallow of oxen. These bonnets are from eight to ten inches high, and they spend a good deal of time in preparing them: For this purpose, the tallow must be well refined; they apply but little of it at a time, and mingle it so compleatly with their hair, that it never falls off*. M. Kolbe alledges, that their noses are flat from their birth, and that they use no arts to flatten them; that they do not stammer, or strike the palate with their tongue, like the Hottentots; that they build houses, cultivate the ground, and sow a species of maize or Turkish corn, of which they make ale, a drink unknown to the Hottentots†.

Beyond the territory of Natal, we meet with those of Sofala and Monomotapa. According to Pigafetta, the people of Sofala are black, but taller and thicker than the other Caffres. This author places the Amazones in the neighbourhood of the kingdom of Sofala‡. But nothing can be more uncertain than what has been affirmed with regard to those female warriors. The natives

* Dampier, tom. 2. p. 393.

† Descript. du Cap. tom.

1. p. 136.

‡ See Indiae Orient. part. 1. p. 54.

tives of Monomotapa, say the Dutch travellers, are tall, handsome, black, and have fine complexions. The young girls go naked, wearing only a thin piece of cotton stuff upon their middle; but put on garments as soon as they get husbands. These people, though very black, are different from the Negroes. Their features are neither so coarse nor so ugly; their bodies have no bad smell; and they can neither support servitude nor hard labour. Father Charlevoix tells us, that he has seen blacks of Monomotapa and Madagascar in America; but that they could never be trained to labour, and soon perished*.

The natives of Madagascar and of Mosambique, are more or less black. The inhabitants of Madagascar have the hair on the crown of their heads not so much crisped as those of Mosambique. Neither of them are true Negroes; and, though those on the coast are very submissive to the Portuguese, the people in the interior parts of the continent are extremely savage, and jealous of their liberty. Both men and women go perfectly naked; they eat the flesh of elephants, and sell the ivory to strangers†. Madagascar is chiefly inhabited by blacks and whites, who, though very tawney, seem to be a different race of men. The hair of the former is black and crisped;

* Hist. de St Dominique, p. 499. † See Recueil des Voyages, tom 3. p. 623.; Le Voy. de Moquet, p. 265.; et La Navigation de Jean Hugues Lintscot, p. 20.

crisped; that of the latter is fairer, less frizled, and longer. It is a common opinion, that these whites derive their origin from the Chinese. But Francis Cauche properly remarks, that they seem to be of European extraction; for he assures us, that all of them he saw had neither flat faces nor noses, like the Chinese. He likewise says, that these whites are fairer than the Castilians; that their hair is long; that the blacks are not flat-nosed like those on the continent; and that their lips are thin. In this island there are also many persons of an olive or tawny colour, who probably proceed from a mixture of the blacks and whites. The same traveller informs us, that the inhabitants round the bay of St Augustine are tawny; that they have no beard; that their hair is long and smooth; that they are tall and handsome; and, lastly, that they are all circumcised, though they probably never heard of the law of Mahomet, for they have neither temples, mosques, nor religion *. The French first landed and established a settlement on this island; but it was not supported †. When they arrived, they found the white men above described; and they remarked, that the blacks had a great respect for these whites ‡. The island of Madagascar is extremely populous, and abounds in cattle and pasturage. Both men and women are exceedingly debauched; and public

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prostitution

* Voyage de François Cauche, p. 45. † Voy. de Flacour.

‡ Voy. de M. Delon.

prostitution is not followed with dishonour. They love dancing, singing, and similar amusements. Though indolent, they have some knowledge of the mechanic arts; and, though they have no moveables in their houses, but lie upon mats, they have husbandmen, smiths, carpenters, potters, and even goldsmiths. They eat their meat almost raw, and devour the skins of their oxen, after singeing the hair; they likewise eat the wax with the honey. The common people go almost naked; but the more opulent wear drawers or petticoats of cotton and silk*.

The natives of the interior parts of Africa are too little known to admit of description. Those called *Zingues* by the Arabians are black, and almost perfectly savage. Marmol tell us, that they multiply prodigiously, and would over-run the adjacent country, if numbers of them were not swept off, from time to time, by a great mortality occasioned by hot winds.

Upon the whole, it appears, that the Negroes are a different species of Blacks from the Caffres. But, from the descriptions we have given, it is still more apparent, that the differences of colour are produced by the climate; and that the peculiarities in features depend much upon the customs which take place among different nations, such as, flattening the nose, pulling the hair off the eye-brows, lengthening the ears, thickening the lips,

* Le Voyage de Flacour, p. 90.; Struys, tom. 1. p. 32. Pyrard, p. 38.

lips, making the face broad, &c. Nothing can be a stronger proof of the influence of climate upon colour, than to find, under the same latitude, and distinct from each other more than 1000 leagues, people so similar as the Nubians and natives of Senegal; and to find, that the Hottentots, who must have originated from a black race, are the whitest people in Africa, for no other reason but because their country is the coldest. If the tawny nation on one side of the river Senegal, and the perfect blacks on the other, occur as an objection, I must refer to what was above remarked concerning the effects of food, which has a great influence on colour, as well as many other customs and modes of living: And, if an example be demanded, I shall produce one from the brute creation, which every man is in a condition to verify. The flesh of the hares that live in the plains and moist grounds, is whiter than that of those which inhabit mountainous or dry regions; and, even in the same part of the country, those that feed in the meadows are perfectly different from those that dwell on the hills. The colour of the flesh proceeds from that of the blood and other humours of the body, the qualities of which necessarily depend on the nature of the food.

The origin of black men has, at all times, been an object of inquiry. The ancients, who knew only those of Nubia, regarded them as the last or terminating shade of the tawny colour, and

and confounded them with the Ethiopians, and other African nations, who, though extremely brown, belong more to the white than to the black race. They thought that the differences of colour among the human species proceeded solely from the varieties of climate, and that blackness was occasioned by a perpetual exposure to the hot rays of the sun. This opinion, though very probable, was much weakened, after it was discovered that the inhabitants of more southern climates, and even under the Equator itself, as those of Melinda and Mosambique, were not black, but very tawny; and when it was farther discovered, that blacks transported into more temperate climates, lost nothing of their original hue, but communicated it to their descendants. If we attend, however, to the migrations of different people, and to the time necessary to produce a change in their colour, we shall, perhaps, find the opinion of the ancients to have been well founded; for the natives of this part of Africa are Nubians, and will preserve their original blackness as long as they continue to live under the same climate, and mix not with the whites. But the Ethiopians, the Abyssinians, and even the natives of Melinda, though they derive their origin from the whites, their religion and customs being the same with those of the Arabians, are, however, more tawny than the inhabitants of the southern parts of Arabia. This circumstance alone evinces, that,
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even among the same race of men, the different degrees of blackness depend, more or less, upon the heat of the climate. Many ages are, perhaps, necessary to change the white colour into perfect blackness; but it is probable, that, in a succession of generations, a white people, transported from the north to the Equator, would undergo this change, especially if they adopted the manners, and used the food of the new country.

The objection drawn from the difference of features is not unfurmountable; for the features of a Negro, who has not been purposely deformed in his infancy, differ not more from those of an European, than a Tartar differs from a Chinese, or a Circassian from a Greek: And, with regard to the hair, the nature of it depends so much on the quality of the skin, that any differences which take place in it ought to be considered as merely accidental; for, in the same country, and even in the same village, we find every possible variety of hair. In France, for example, there are some men whose hair is as short and as crisped as that of a Negro: Besides, heat and cold have great influence upon the colour of the hair both of men and other animals. In the northern regions, black hair is seldom or never seen: And squirrels, hares, weasels, and several other animals, are white in the north, but brown or gray in more southern latitudes. The effects produced by cold and heat are even
so

so remarkable, that, in Sweden, certain animals as the hares, are gray during the summer, and perfectly white in winter*.

But the New World affording no examples of true Blacks, is the strongest argument against my hypothesis; and it appears, at first sight, to be almost insuperable. If blackness were the effect of heat alone, why do we not find Negroes or black men in the Antilles, in Mexico, in Santa-fé, in Guiana, in the country of the Amazonas, or in Peru; since these countries of America are situated under the same latitude with Senegal, Guiney, and Angola in Africa? If the different colours of the human species were occasioned by the climate, or the distance from the Pole, we should have found, in the Brasils, in Paraguay, or in Chili, men similar to the Caffres and Hottentots. But, before attempting to remove this objection, it is necessary to give a short description of the various American nations; after which we shall be the more qualified to make just comparisons, and to draw general conclusions.

In the most northerly regions of America, we find a species of Laplanders, similar to those of Europe, or to the Samoiedes of Asia. Though their numbers are few, they are spread over a large extent of country. Those who live round Davis's Straits, are small, of an olive colour, and have

* *Lepus* apud nos aestate cinereus, hieme semper albus; Linnæi Faun. Succ. p. 8.

have short thick limbs. They are excellent fishers, and eat their meat and fish raw. Their drink is pure water, or the blood of the sea-dog. They are very robust, and long-lived*. These are exactly the figure, colour, and manners of the Laplanders: And, what is singular, as the Fins, who are adjacent to the European Laplanders, are white, beautiful, and pretty large and handsome; so, in the neighbourhood of the American Laplanders, we find a species of men, who are tall, handsome, pretty white, and possessed of very regular features†. The savages along Hudson's Bay, and to the north of Labrador, though they are small, ill made, and ugly, appear not to be of the same race with the former. Their visage is almost entirely covered with hair, like the savages of the lands of Jesso, to the north of Japan. In summer they dwell in tents made of the skins of the rein-deer; and, in winter, they live under ground, like the Laplanders and Samoiedes, where they lie promiscuously, and without ceremony. Though their food consists only of raw flesh and fish, they live very long‡. The savages of Newfoundland resemble those of Davis's Straits. They are of small stature, have little or no beard, broad faces, large eyes, and generally flat noses. The traveller who gives the description, adds, that they have

* Hist. Nat. des Isles, p. 189.
de Rob. Lade, tom. 2. p. 309.

† Ibid.

‡ Voyage

have a great similarity to the savages in the environs of Greenland*.

To the south of these savages, who are spread over the northern regions of America, we meet with a different and more numerous race, who occupy Canada, and the adjacent territories, as far as the Assiniboils. They are large, strong, well made, and all of them have black hair, black eyes, very white teeth, a swarthy colour, little beard, and hardly any hair on their bodies. They are indefatigable in travelling, and extremely nimble in the chase. With equal ease they can support hunger, and the greatest excess in eating. They are hardy, bold, grave, and moderate: In a word, they have so strong a resemblance, both in their external appearance, and in their manners and dispositions, to the oriental Tartars, that, if they were not separated by a vast sea, we would believe them to have sprung from the same nation. They also live under the same latitude; which is a farther proof of the influence of climate upon the figure and colour of the human species. To conclude, in the northern extremities of the New Continent, as well as in those of the old, we first find men similar to the Laplanders, and likewise a race of whites with fair hair, like the inhabitants of the north of Europe; then hairy men resembling the savages of Jesso; and, lastly, the savages of Canada, who occupy the whole territory as far

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* Recueil des Voyages au Nord. tom. 3. p. 7.

as the Gulf of Mexico, and so strongly resemble the Tartars, that, if there were no embarrassment concerning the possibility of their migration, we would conclude them to be the very same people. However, if we attend to the small number of men scattered over the immense territories of North America, and their universal want of civilization, we must admit that all these nations of savages have been peopled by the escape of individuals from some more numerous race. Though we should allow the number of natives to be now reduced to a twentieth part of what they were on the first discovery of America, still this country was even then so thinly inhabited, that it must be considered as a desert, or a land so recently peopled, that the men had not time sufficient for an extensive multiplication. M. Fabry*, who penetrated farther into the interior parts of this country, to the northwest of the Mississippi, than any other man had done, and where, of course, the savages could not have suffered any diminution by the inroads of the Europeans, assures us, that he often travelled in this region 200 leagues without seeing a human face, or any marks which indicated the adjacent country to be inhabited; and that, when he did meet with any Indian huts, they were always at least 100 leagues distant from each other, and seldom contained above 20 persons. Along the banks of rivers and lakes, it is true, the savages

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are

* Hist. Nat. gen. et particul. tom. 1. p. 340.

are more numerous, and some of them are even troublesome to our colonists. But these nations seldom exceed three or four thousand persons, and are spread over a country often more extensive than the kingdom of France: So that I am persuaded there are more men in Paris than all the natives of North America, from the Gulf of Mexico to the Northern Ocean, though this territory is much larger than Europe.

Population depends more on society than Nature. Men would not be comparatively so numerous as the savage animals, if they were not united, and derived not mutual aid and succour from society. In North America, the bisons* are perhaps more abundant than the men. But, though population be a result of society, it is the increased number of men which necessarily produces their unity. We may, therefore, presume, that the want of civilization in America is owing to the paucity of its inhabitants; for, though each nation had peculiar customs and manners, though some were more savage, cruel, and dastardly than others; yet they were all equally stupid, ignorant, and destitute of arts and of industry.

I have run, perhaps, into too great a detail concerning the manners of savage nations. Most authors have mistaken the particular actions of individuals, which often result from caprice or unknown circumstances, for the general and established

* A species of wild ox.

established manners of a nation. Some people, they tell us, eat their enemies; others burn or maim them; some delight in war; others love peace. Some kill their parents after they arrive at a certain age; among others, the fathers and mothers eat their own children. These, and similar narrations, so much delighted in by travellers, are reducible to single facts, and import no more than that one individual savage eat his enemy, another burned or maimed him, and a third killed or eat his own child. All these examples may be found in every savage nation; for a people who live without the restraint of fixed laws, or of a regular government, can only be considered as a tumultuous assemblage of barbarous and independent individuals, who obey no laws but those of passion and caprice, and who, having no common interest, are incapable of pursuing any determined standard of manners, which supposes general views that have obtained the sanction both of time and a majority of numbers.

A nation, it may be said, is composed of men who are known to each other, who speak the same language, who unite, when necessary, under the same chief, who use the same arms, and who paint themselves with the same colours: To this we might subscribe, without difficulty, if these manners were constant and uniform; if the people did not often unite and separate without design; if their chief lost not all authority by

by their caprice or his own; and if their language was not so simple as to be almost common to every tribe.

As they have but few ideas, their expressions are limited to the most common objects; and, though every mode of expression should differ from another; yet the smallness of their number necessarily renders them of easy acquisition. It is not, therefore, so difficult for a savage to learn the language of all other savages, as for a polished man to learn the language of another people equally advanced in civilization.

But it is, perhaps, of more importance to examine the nature of the individual savage, than to enlarge upon the manners and customs of these pretended nations. Of all animals, a savage man is the most singular, the least known, and the most difficult to describe. We are so ill qualified to distinguish the genuine gifts of Nature from what is acquired by education, art, and imitation, that it would not be surprising if we should totally mistake the real portrait of a savage, though the natural colouring and features of his character were faithfully represented to us.

An absolute savage, such as the boy brought up by the bear, described by Conor *, the young man found in the forest of Hanover, or the girl discovered in the woods of France, would be a curious object to a philosopher, by the contemplation of which he might estimate the force of

virtues if their chief lost all authority

Evang. Med. p. 133.

natural appetites: Here he would see the mind perfectly naked; he might distinguish all its movements; he might, perhaps, discover in it more sweetness and tranquillity than in his own; he might, perhaps, clearly perceive, that virtue is more natural to the savage than to the civilized, and that vice derives its origin and support from society alone.

But to return to our subject: If North America affords only savages, Mexico and Peru present us with a polished people, governed by laws, and subject to regal establishments. They had industry, arts, and a species of religion. They dwelt in cities, where order and police were maintained by the authority of the sovereign. These people, who were very numerous, cannot be considered as new nations, or as originating from individuals who had escaped from Europe or Asia, from whom they are so remote. Besides, if the savages of North America, because they are situated under the same latitude, resemble the Tartars; the people of Mexico and Peru, though, like the Negroes, they live under the Torrid Zone, have no similarity to them. What then is the origin of these people, and what cause can be assigned for the difference of colour in the human species, since the influence of climate is insufficient, in this case, to solve the phaenomenon?

Before answering these questions, we must continue our description of the savages of South America. Those of Florida, of the Mississippi,
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and of the more southerly regions, though not absolutely brown, are more tawny than the Canadians. The oil and paint with which they rub their bodies, render their colour unnaturally olive. Coreal tells us, that the women of Florida are tall, strong, and, like the men, of an olive colour; that they paint their arms, limbs, and body, with several colours, which remain for ever, because they are engrained in the skin by means of puncturing; that the olive colour of both sexes proceeds not so much from the heat of the climate, as from the oil with which they varnish their skin: He adds, that the women are extremely active; that, with an infant in their arms, they swim across large rivers; and that, with equal agility, they climb the highest trees *. All these qualities they possess in common with the Canadians and other savages of America. The author of the Natural and Moral History of the Antilles remarks, that the Apalachians, a people bordering on Florida, are tall, well-shaped, and of an olive colour; and that they all have long black hair: He adds, that the Caribbees, who inhabit the Antilles, have sprung from the savages of Florida; and that the time of their migration has been handed down by tradition †.

The natives of the Lucai islands are less tawny than those of St Domingo and Cuba. But so few

* See le Voy. de Coreal, tom. I. p. 36.

† Hist. Nat. des îles Antilles, p. 351.

few of either now remain, that the relations of the first voyagers to these countries can derive no support from them. These people, it has been alledged, were very numerous; that they were governed by a kind of chiefs called Caciques; and that they had priests and physicians. But all this is problematical, and, besides, has no connection with our history. The Caribbees, in general, says Father du Tertre, are tall, and have a pleasant aspect; they are strong, robust, active, and healthy; some of them have flat visages and depressed noses: But these features are not natural to them, but artificially induced by their parents, soon after birth. This capricious practice of altering the natural figure of the head is very general among savage nations. Most of the Caribbees have small black eyes, white teeth, and long, smooth, black hair. Their colour is tawny or olive; and this colour is natural to them, and not the effect of painting, as some authors have maintained; for the colour of such of their children as have been trained up among Europeans, and not allowed the use of paint, was precisely the same with that of their parents. All these savages, though they never think, have a pensive melancholy aspect. Though cruel to their enemies, they are naturally mild and compassionate. They marry indifferently, either their own mothers or strangers. Their cousins-german belong to them by law; and several of them have been known to possess, at the same time, two sisters,
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or the mother and the daughter, and even their own daughter. Those who have several wives, visit them alternately for a month, or a stated number of days, which extinguishes jealousy among the women. They easily pardon adultery in their wives; but they never forgive him who debauches them. They feed upon crabs, turtles, lizards, serpents, and fishes, which they season with pimenta and the flour of manioc *. Being extremely indolent, and accustomed to the most unbounded independence, they detest servitude, and never can be trained to labour like the Negroes. To preserve their liberty, they exert every effort; and, when they find it impracticable, they, rather than work, chuse to die of hunger, or of chagrin. The Arrouaguas, who are milder than the Caribbees, are sometimes employed; but it is only in fishing or hunting, exercises of which they are naturally fond, and to which they have been accustomed in their own country. If these savages are to be retained as slaves, they must be treated with as much gentleness as domestic servants, otherwise they will desert, or perish with melancholy. The Brazilian slaves have nearly the same disposition, though they seem to be less stupid, indolent, and melancholy than any other American savages. However, when treated with gentleness, they may be trained to any operation, except that of cultivating the ground, which

* Hist. gen. des Antilles, par du Tertre, tom. 2. p. 453, &c.

which they consider as the characteristic badge of slavery.

Savage women are always less than the men. The Caribbee females are fat, and tolerably handsome. Their hair and eyes are black; their visage is round, their mouth small, their teeth white; their air is more open, gay, and lively, than that of the men; and they are modest and reserved. They daub themselves with paint; but they do not use the black strokes upon the face and other parts of the body, as is customary with the men. They wear only a small apron, made of cotton, studded with beads, about eight or ten inches broad by five or six long. This stuff they purchase of the Europeans; and, besides the apron, they use collars of the same cloth round their necks, which hang down upon their bosoms. They likewise wear bracelets of this stuff on their wrists and arms, and ear-rings made of a blue stone or of strings of beads. The last ornament peculiar to the women is a kind of buskin of cotton studded with beads, which extends from the ankle to the calf of the leg. As soon as the girls arrive at the age of puberty, they are furnished with an apron and buskins, the latter of which are made so tight, that they cannot be removed; and, as they prevent the under part of the leg from thickening, the upper parts grow larger and stronger than they would naturally do*.

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* Nouv. Voy. aux isles, tom. 2. p. 8.

The inhabitants of Mexico and Peru are so mixed, that it is difficult to find two faces of the same colour. In the town of Mexico, there are Europeans, Indians from north and south America, African Negroes, Mulattoes, and mongrels of every kind ; so that we see men there of every shade between black and white *. The natives of the country are brown or olive, well-made, and nimble. They have little hair, even on their eye-brows ; but that on their head is very long and very black †.

The natives of the Isthmus of America are, as Wafer remarks, generally of a good stature and shape. They have elegant limbs, a full chest, and are extremely active and fleet in the chase. The women are little and squat ; and though, when young, they are jolly and have brilliant eyes ; yet they possess not equal vivacity with the men. Both men and women have round faces, short flat noses, large eyes, mostly of a gray colour, and full of fire, high fore-heads, white teeth, thin lips, mouths of a middle size, and, in general, a very regular set of features. They all have long, black, straight hair ; and the men would have beards, if they did not pull out the hairs. Their colour is tawny ; and their eye-brows are as black as jet.

But these are not the only natives of this Isthmus ; for we find among them a species of white

* Lettres Edifiantes, recueil 11. p. 119.

† Voy. de Coreal, tom. 1. p. 116.

white men, whose colour resembles not that of the Europeans, but their whiteness is similar to that of milk, or to the hairs of a white horse. Their skin is covered with a kind of short white down, which is not so thick upon the cheeks and fore-head as to conceal the skin. Their eye-brows are perfectly white, as well as their hair, which is seven or eight inches long, and half crisped. These Indians are not so tall as the others; and, what is singular, their eye-lids are oblong, or rather in the form of a crescent, with the points turned down. Their eyes are so weak, that they can hardly see any object during the day; they cannot suffer the rays of the sun, and have no distinct vision but from the light of the moon. Their complexion is extremely delicate; they have an abhorrence at all hard labour; they sleep during the day, and never go abroad but in the night. When the moon shines, they run through the deepest shades of the forests with as much freedom and nimbleness as other men do in the clearest day. Upon the whole, these men are neither so robust nor vigorous as the other Indians: They form a peculiar and distinct race. But it sometimes happens, that a husband and wife, though both of a copper colour, produce one of these white children. Wafer, from whom I have transcribed these facts, tells us, that he has seen a child of this kind before it was a year old *.

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* Dampier, tom. 4. p. 252.

If this fact be true, the singular colour and constitution of these white Indians would be only a species of disease which they derive from their parents. But, if these white Indians are not produced by those of a copper colour, but form a distinct race, then they resemble the Chacrelas of Java, and the Bedas of Ceylon, which I have described above. If, however, these white people actually proceed from copper-coloured parents, we must allow that the Chacrelas and Bedas have also been produced by tawny progenitors, and that all the white men, whom we find at such great distances from each other, form not a particular race, but are only individuals who have accidentally degenerated from their original stock.

This last opinion, I acknowledge, seems to be the most probable; and, if voyagers had given us descriptions of the Bedas and Chacrelas equally exact with what Wafer has given of the Dariens, we should, perhaps, have been satisfied that they are not, any more than the latter, of European extraction. The production of whites by Negro parents, which sometimes happens, adds great force to this theory. In the history of the French Academy, we have descriptions of two of these white Negroes. I have seen one of them myself, and I am assured, that they are very frequent among the Negroes of Africa*. What I have seen, independent of the relations
of

* Venus Physique.

of voyagers, leaves me no room to doubt concerning the origin of these white Negroes: They are only Negroes who have degenerated from their race, and not a particular and permanent species of men: In a word, they are among the Negroes, what Wafer tells us the white Indians are among the yellow or copper-coloured Indians of Darien, and, probably, what the Chacrelas and Bedas are among the brown Indians of the East. It is singular, that this variation of nature takes place only from black to white, and not from white to black. It is no less singular, that all the people in the East Indies, in Africa, and in America, where these white men appear, lie under the same latitude: The Isthmus of Darien, the Negro country, and the island of Ceylon, are under the very same parallel. Whites, then, appears to be the primitive colour of nature, which may be varied by climate, by food, and by manners, to yellow, brown, and black, and which, in certain circumstances, returns, but so greatly altered, that it has no resemblance to the original whiteness, because it has been adulterated by the causes which have already been assigned.

Upon the whole, the two extremes continually approach each other. Nature, in her most perfect exertions, made men white; and the same Nature, after suffering every possible change, still renders them white: But the natural or specific whiteness is very different from the individual

dual or accidental. Of this we have examples in vegetables, as well as in men and other animals. A white rose is very different, even in the quality of whiteness, from a red rose, which has been rendered white by the autumnal frosts.

A still farther proof that those white men are only degenerated individuals, may be drawn from their comparative weakness of constitution, and from the extreme feebleness of their eyes. This last fact will appear to be less singular, when we reflect, that, in Europe, very fair men have generally weak eyes; and I have frequently remarked that their organs of hearing are often dull. Nay, it is even alledged, that dogs of a perfect white colour, are deaf: Whether this be generally the case, I know not; but I have found it to be true in several instances.

Like the natives of the Isthmus, the Indians of Peru are of a copper-colour, especially those who dwell in the plains, and along the sea-coast; for those who live in the elevated parts of the country, as between the two chains of the Cordeliers, are nearly as white as the Europeans. Some parts of Peru are a league higher than others, which, with regard to the temperature of the climate, produces a greater change than an hundred leagues of latitude. All the Indians in Guiana and along the river of the Amazons, are more or less of a reddish tawny colour. The difference of shades, says M. de la Condamine, is chiefly owing to the temperature of the air, which

which varies from the extreme heat of the Torrid Zone, to the great colds occasioned by the neighbourhood of the snow*. Some of these savages, as the Omaguas, flatten the visages of their children, by lacing their heads between two boards†. Others pierce the nostrils, lips, or cheeks, in order to fix in them the bones of fishes, feathers, and other ornaments. Most of them pierce their ears, and use flowers and herbs in place of ear-rings‡. Concerning the Amazonas, I shall be entirely silent. The reader may consult the writers upon this subject; and after perusing them, he will not discover evidence sufficient to prove the existence of this race of females§.

Some voyagers mention a nation in Guiana, of which the natives are blacker than any other Indians. The Arras, says Raleigh, are nearly as black as the Negroes, are extremely strong, and use poisoned arrows. This author speaks likewise of another nation of Indians, whose necks are so short, and shoulders so elevated, that their eyes seem to be upon their shoulders, and their mouths in their breast. This monstrous deformity cannot be natural: It is not improbable, that savages, who delight in disfiguring

* Voy. de la Condamine, p. 49.

† Ibid. p. 72.

‡ Ibid. p. 48. &c.

§ Ibid. p. 101.; Raleigh; Coreal, tom. 2. p. 25.; La relation du P. d'Acuna, tom. 1. p. 237.; Lettres edifiantes, recueil 10. p. 241.; Voy. de Mocquet, p. 101. &c.

ring Nature by flattening, rounding, or lengthening the heads of their children, should likewise conceive the fancy of sinking their heads between their shoulders. To give rise to such absurd caprices, nothing farther was necessary than the idea that deformity rendered them more terrible to their enemies. The Scythians, who were formerly as savage as the present American Indians, entertained the same notions, and practised the same ridiculous arts, which unquestionably gave rise to what the antients have written concerning men without heads, men with dogs heads, &c.

The savages of Brasil are nearly of the same size with the Europeans; but they are stronger, more robust, and more nimble: Neither are they subject to so many diseases; and they live very long. Their hair, which is black, rarely grows hoary with age. Their colour is tawny, being a mixture of brown and red. They have large heads, broad shoulders, and long hair. They pull the hairs out of their beards, their eye-brows, and every other part of their bodies, which gives them an uncommon and fierce aspect. They pierce their under lip for the purpose of inserting a small bone polished like ivory, or a green stone. The mothers flatten the noses of their children immediately after birth. They all go absolutely naked, and paint their bodies with various colours*. Those of them who lie

* See Voy. de Lery, p. 108.; Coreal, tom. 1. p. 163.; Mem.

lie on the sea-coasts are now a little civilized by the trade they carry on with the Portuguese; but most of those who inhabit the interior parts of the country are still absolute savages. It is not by force and by slavery that savages are civilized: The missionaries have polished more men in these savage nations than the arms of those princes who subdued them. It was in this manner that Paraguay was conquered. The natural ferocity and stubbornness of these savages were overcome by the gentleness, humanity, and venerable example of the missionaries. They often spontaneously solicited to be instructed in that law which rendered men so perfect; and they frequently submitted to its precepts, and united with society. Nothing can reflect greater honour on religion than the civilizing of these nations of Barbarians, and laying the foundations of an empire, without employing any other arms but those of virtue and humanity.

The inhabitants of Paraguay are, in general, pretty tall, and well shaped: Their visage is long, and their skin of an olive colour*. They are sometimes affected with an extraordinary disease: It is a species of leprosy, which forms a crust over the whole body, resembling the

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Mem. pour servir a l'hist. des Indes, p. 287.; l'hist. des Indes par Maffée, p. 71. Pyrard, tom. 2. p. 337.; Lettres edifiantes, recueil 15. p. 331. &c.

* Coreal, tom. 1. p. 240. et 259.; Lettres edifiantes, recueil 11. p. 391.; Recueil 12. p. 6.

scales of fishes; but it neither occasions pain, nor does any injury to their constitution *.

Like the Peruvians, the Indians of Chili, according to Frezier, are of a tawny colour, resembling reddish copper. This colour is different from that of the Muffatoes, who, as they are produced by a white man and a Negro woman, or a white woman and a Negro man, are of a brown colour, or a mixture of black and white. The Indians of South America, on the contrary, are yellow, or rather reddish. The natives of Chili are of a good size; they have thick limbs, a large chest, a disagreeable visage, small eyes, long ears, and straight, bushy, black hair. They lengthen their ears, and pull out their beard with pinchers made of shells. Though the climate be cold, most of them go naked, excepting a skin thrown over their shoulders. At the extremity of Chili, and on the confines of Terra Magellanica, a gigantic race of men have, it is alledged, been lately discovered. Frezier informs us, on the authority of several Spaniards, who pretended to be eye-witnesses, that these men are nine or ten feet high. These giants, he remarks, are called *Patagonians*, and inhabit the eastern parts of the desert coast mentioned in ancient voyages: The story of the Patagonians was afterwards regarded as perfectly fabulous; because the Indians discovered along the Straits of Magellan surpassed not the ordinary stature of

* Lettres edifiantes, recueil 25. p. 122.

of men. It is this circumstance, he continues, that might deceive Froger in his account of the voyage of M. de Gennes; for both species of men have been seen at the same time by the crew of one vessel. In 1709, the crew of the *James* of St Malo saw seven of these giants in Gregory Bay, and those of the *St Peter* of Marseilles saw six, whom they accosted, and offered them bread, wine, and brandy, which they refused, though they had presented the sailors with some arrows, and assisted them in bringing the ship's boat ashore*. But, as M. Frezier does not alledge that he himself saw any of these savages, and as the relations which mention them are replete with exaggerations with regard to other subjects, the existence of a race of giants, especially so high as ten feet, must be still held as problematical: The body of such a man must be eight times the bulk of that of an ordinary person. The mean height of the human species is about five feet; and the extremes exceed not one foot above or below this standard. A man of six feet is very tall, and a man of four is very little. Giants and dwarfs who exceed these terms ought to be considered as accidental varieties, and not as distinct and permanent races.

Farther, if those Magellanic giants exist, their number must be very small; for the savages of the Straits and of the adjacent islands are of a middle stature. Their colour is olive; they have

* Voy. de M. Frezier, p. 75.

a large chest, squat bodies, thick limbs, and black straight hair*. In a word, their stature exceeds not the common standard, and, both in colour and hair, they resemble the other Americans.

Thus, the whole continent of America contains but one race of men, who are all more or less tawny: And, if we except the northern regions, where we find men similar to the Laplanders, and likewise men with fair hair, like the inhabitants of the north of Europe, all the rest of this vast territory is peopled with inhabitants, among whom there is little or no diversity. In the Antient Continent, on the other hand, we have found a prodigious variety in different nations. This great uniformity among the natives of America seems to proceed from their living all in the same manner. All the Americans were, or still are savages: The Mexicans and Peruvians were so recently polished, that they ought not to be regarded as an exception. Whatever, therefore, was the origin of these savages, it seems to have been common to the whole. All the Americans have sprung from the same source, and have preserved, with little variation, the characters of their race; for they have all continued in a savage state, and have followed

* See Coreal, p. 231. and 284.; l'Hist. de la conquête des Molucques, par Argensola, tom. 1. p. 35. and 255.; le Voy. de M. de Gennes, par Froger, p. 97.; les Voy. de la Comp. d'Holl. tom. 1. p. 651.; and Dampier, p. 179. &c.

followed nearly the same mode of life. Their climates are not so unequal, with regard to heat or cold, as those of the Antient Continent, and their establishment in this country has been too recent to allow those causes which produce varieties sufficient time to operate, so as to render their effects conspicuous.

Each of these reasons merits a separate discussion. That the Americans are a new people, can admit of no doubt, when we consider the smallness of their number, their ignorance, and the little progress made by the most civilized of them in the arts of life: For, though the first relations of the discovery and conquest of America mention Mexico, Peru, St Domingo, &c. as countries full of people, and though we are told, that the Spaniards had every where to conquer numerous armies; yet it is easy to perceive that these facts are exaggerated; because, in the first place, few monuments remain of the pretended grandeur of these people; 2dly, Because their country, though now peopled with Europeans, who are unquestionably more industrious than the natives, is still wild, uncultivated, and covered with wood; and, besides, it is only a group of inaccessible and uninhabitable mountains, which, of course, leaves only small spots proper either for culture or habitation; 3dly, Because, even according to their own traditions, concerning the time when they first united into society, the Peruvians reckon only 12 kings,

kings, the first of whom began to civilize them*; and thus it appears, that not above 300 years had elapsed since the Peruvians ceased to be absolutely savage; 4thly, Because, if these people had been numerous, the Europeans, even with the advantage of gun-powder, would never have been able to enslave them. The Negroes, notwithstanding all our attempts to conquer and reduce them to subjection, still preserve their independence, though the effects of gun-powder were equally unknown and equally formidable to them as to the Americans. The facility, therefore, with which America was conquered, appears to be a demonstration that this country was thinly and recently inhabited.

In the new Continent, the temperature of the different climates is more equal than in the Antient Continent. This effect is the production of several causes. The Torrid Zone is not so hot in America as in Africa. The territories of America comprehended under this Zone are Mexico, New Spain, Peru, the country of the Amazones, Brasil, and Guiana. The heat is never excessive in Mexico, in New Spain, or in Peru; because these countries are greatly elevated above the ordinary surface of the globe. The thermometer, during the hottest weather, never rises so high in Peru as in France. The air is cooled by the snows which cover the tops of the mountains; and this cause, which is a consequence

* Hist. des Incas, par Garcilasso, &c.

consequence of the former, has great influence on the temperature of the climate. The natives also, instead of being black or very brown, are only tawny. The country of the Amazonas is covered with lakes, marshes, rivers, and forests. There the air is extremely moist, and, of course, much cooler than if the land were dry. It is, besides, worthy of remark, that the east wind, which blows constantly between the Tropics, arrives not at Brasil, the Amazone country, or Guiana, till it has traversed a vast ocean, and acquired a considerable degree of cold. It is for this reason, as well as the quantity of water, forests, and almost perpetual rains, that these regions of America are much more temperate than they would otherwise be. But the east wind, in traversing the low lands of America, acquires a considerable degree of heat before it arrives at Peru. The air in Peru, therefore, would be much hotter than in Brasil or Guiana, if it was not cooled by the elevation of the country and snows. The east wind, however, still retains so much heat as to have an influence on the colour of the natives; for those who, by their situation, are much exposed to it, are more yellow than those who live in the valleys between the mountains, and are protected from the effects of this wind. Besides, this wind, after striking against the high mountains, is reflected upon the adjacent plains, and carries along with it that freshness which it acquires from the

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the snow which covers their summits; and the melting of the snow must, of itself, frequently produce cool winds. The united operation of these causes renders the Torrid Zone of America uncommonly temperate. It is not, therefore, surprising, that we find not, in this country, black, or even brown men, similar to the natives of Africa or Asia who live under the same parallels, where the circumstances to be afterwards mentioned are extremely different. Whether we suppose, then, the inhabitants of America to have been antiently or recently established in that country, we ought not to find black men there; because their Torrid Zone is a temperate climate.

The last reason I mentioned for the little variety among the Americans, was the uniformity in their mode of living. They were all savage or very recently civilized, and they all lived in the same manner. Supposing them to have been derived from a common origin, they were dispersed, without having their breed crossed. Each family gave rise to a nation, the inhabitants of which were not only similar to each other, but to all the neighbouring tribes. As both their food and their climates were nearly the same, they had no means either of improving or degenerating. They must, therefore, have always continued the same, whatever climate they chanced to occupy.

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With regard to their origin, I have no doubt, independent of theological considerations, but that it is the same with ours. The resemblance of the North American savages to the oriental Tartars, renders it probable, that they originally sprung from the same stock. The late discoveries by the Russians of several lands and islands beyond Kamtschatka, which extend nearly as far as the west part of the Continent of America, leave no room to question the possibility of a communication, provided these discoveries were well attested, and the lands lay contiguous. But, even supposing considerable intervals of sea, is it not extremely probable that some had crossed these intervals in quest of new countries, or that they were thrown upon the American coasts by tempests? There is, perhaps, a greater interval of sea between the Marianne islands and Japan, than between any of the lands from Kamtschatka to America; and yet the Marianne islands were peopled with inhabitants who must have come from the eastern continent. I am, therefore, inclined to believe that the first men who arrived at America, landed on the north-west of California; that the extreme cold of this climate obliged them to migrate to the more southern parts of their new habitation; that they first settled at Mexico and Peru, from whence they again spread over the southern and northern regions of that continent; for Mexico and Peru must be considered as the oldest and first inha-

bited territories of America, because they are the most elevated, and the only countries where men were found in the form of regular societies. We may also presume that the inhabitants of Davis's Straits, and of the northern parts of Labrador, came originally from Greenland, which is only separated from America by this narrow strait; for, as I formerly remarked, the natives of Davis's Straits, and those of Greenland, have a perfect resemblance to each other. As to the manner in which Greenland was peopled, it is probable that the Laplanders would migrate from Cape-north, which is only 150 leagues from Greenland. Farther, as the island of Iceland is almost contiguous to Greenland, and is not very remote from the most northerly of the Orcades, it is probable that it has long been inhabited and frequented by the people of Europe; and that colonies had even been established in Greenland by the Danes. That white men, with fair hair, should have been found in Greenland, is not, therefore, surprising, as they derived their origin immediately from the Danes; and there is reason to think, that the white men along Davis's Straits proceeded from the European whites, who had been settled in Greenland, from which they might easily pass by traversing the narrow Sea that forms this strait.

America is not less singular for the uniformity in the figure and colour of its inhabitants, than Africa is remarkable for the variety of men

it contains. This part of the world is very ancient, and it abounds with people. The climate is extremely hot; and yet the temperature of the air differs widely in different nations. Their manners also are not less various, as appears from the description given above. All these causes have concurred in producing a greater variety of men in this quarter of the globe than in any other: For, in examining the differences of temperatures in the countries of Africa, we find, that, in Barbary and all the regions adjacent to the Mediterranean, the men are white, and only a little tawny: This whole tract of country is refreshed, on one hand, by the air of the Mediterranean sea, and by the snows on Mount Atlas, on the other: It is, besides, situated in the Temperate Zone, on this side of the Tropic. All the natives, likewise, from Egypt to the Canary islands, are only more or less tawny. Beyond the Tropic, and on the other side of Mount Atlas, the heat becomes much greater, and the inhabitants are very brown, but not entirely black. But, when we come to the 17th or 18th degree of north latitude, under which Senegal and Nubia are situated, the heat is excessive, and the natives are perfectly black. At Senegal, the liquor in the thermometer rises to 38 degrees, while it seldom rises to 30 in France, and never exceeds 25 in Peru, though it be situated under the Torrid Zone. In Nubia, we have no observations made with the thermometer; But all travellers agree

agree in declaring the heat to be excessive. The sandy deserts between Upper Egypt and Nubia heat the air to such a degree, that the north wind must be extremely scorching in that country. Besides, as the east wind, which generally blows between the Tropics, arrives not at Nubia till after it has traversed Arabia, it is not surprising to find the natives very black: It is still less surprising to see the inhabitants of Senegal perfectly black; for the east wind, before it reaches them, must blow over the whole of Africa in its greatest breadth, which renders the heat of the air almost insupportable. Taking, therefore, the whole of Africa situated between the Tropics, where the east wind blows most constantly, we may easily conceive why the western coasts of this part of the globe should, and actually do suffer a greater degree of heat than the eastern coasts; for this wind arrives at the eastern coasts with a freshness which it acquires by traversing a vast sea; but, on the other hand, before it arrives at the western coasts, it acquires a scorching heat by blowing across the interior regions of Africa. It is for this reason that the coasts of Senegal, Sierra-Leona, Guiney, and all the western parts of Africa situated under the Tropics, are the hottest climates on the globe. It is not near so hot on the eastern coasts, as at Mosambique, Mombaza, &c. I cannot, therefore, hesitate in ascribing to this reason the cause of our finding the true Negroes, or the blackest men,

men, on the western territories of Africa, and Caffres, or men of a less deep blackness, on the eastern coasts. The difference between these two kinds of blacks, which is very apparent, proceeds from the heat of the climate, which is not very hot in the eastern parts, but excessive on the western. Beyond the Tropic on the south, the heat considerably diminishes, both on account of the higher latitude, and because the point of Africa begins to turn narrow; and this point of land, being surrounded by the sea, receives fresher breezes than if it had been in the midst of a continent. The natives also of this country begin to whiten, and are naturally more white than black, as was formerly remarked. Nothing can prove more clearly that the climate is the principal cause of the varieties of mankind, than this colour of the Hottentots, whose blackness could not be diminished but by the temperature of the climate.

We will be the more confirmed in this opinion, if we examine the other people who live under the Tropics, to the east of Africa. The inhabitants of the Maldiva islands, of Ceylon, of the point of the Indian Peninsula, of Sumatra, of Malacca, of Borneo, of Celebes, of the Philippine islands, &c. are all very brown, without being absolutely black; because all these territories are either islands or peninsula's. The sea, in these climates, has a great effect in tempering the air; and besides, the east and west winds, which

which blow alternately in this part of the globe, pass over a vast extent of sea, before they arrive at this Archipelago. Thus all these islands are peopled with brown men, because the heat is not excessive. But, in New Guiney, we find blacks, who, from the descriptions of voyagers, appear to be real Negroes; because, in this country, which extends so far to the east as to form a kind of continent, the wind which traverses it is much hotter than that which prevails in the Indian ocean. In New Holland, which is not so hot a climate, the natives are less black, and very similar to the Hottentots. Do not these Negroes and Hottentots, who live so remote from the other people distinguished by that appellation, prove that their colour depends on the heat of the climate? No communication can ever be supposed to have taken place between Africa and this southern continent; and yet we find there the same species of men, because the same circumstances concur in producing the same degree of heat. An example taken from the other animals, will still farther confirm what has been advanced. It has been remarked, that, in the province of Dauphiny, all the swine are black, but that, in Vivarais, on the other side of the Rhone, where it is colder than in Dauphiny, all these animals are white. It is not probable that the inhabitants of one of these two provinces would agree to raise only black swine, and the other only white swine. It appears to me that this
phenomenon

phenomenon is owing to the different temperature of the climates, combined, perhaps, with the manner of feeding these animals.

The few blacks who are found in the Philippines, and some other islands of the Indian ocean, are probably derived from the Papous or Negroes of New Guinea, with which the Europeans have been acquainted only for these last 50 years. Dampier, in the 1700, discovered the most eastern part of this country, to which he gave the name of New Britain; but its extent is still unknown; we only know that these parts of it which have been discovered, seem to be thinly inhabited.

Thus it appears, that the existence of Negroes is confined to those parts of the earth, where all the necessary circumstances concur in producing a constant and an excessive heat. This heat is so necessary, not only to the production, but even to the preservation of Negroes, that it has been remarked in our islands, where the heat, though great, is not comparable to that of Senegal, that the Negro infants are so liable to be affected by impressions from the air, that they are obliged to keep them, for the first nine days after birth, in close warm chambers. If these precautions be neglected, and the children exposed to the air immediately after birth, they are liable to be affected with a tetanus, or locked jaw, which proves fatal, because it deprives them of the power of taking nourishment. M. Littré, who dissected

dissected a Negro in the year 1702, remarked, that the end of the glans, which was not covered with the prepuce, was black, and that the part of it which was covered was perfectly white *. This observation demonstrates, that the air is necessary to produce the blackness of Negroes. Their children are born white, or rather red, like those of other men. But, two or three days after birth, their colour changes to a yellowish tawny, which grows gradually darker till the 7th or 8th day, when they are totally black. It is well known, that all children, two or three days after birth, are affected with a kind of jaundice, which, among white people, soon passes off and leaves no impression: But in Negroes, on the contrary, it gives an indelible colour to the skin, which becomes always more and more black. M. Kolbe remarks, that he has seen Hottentot children, who were born as white as the Europeans, become olive in consequence of this jaundice which spreads over the skin three or four days after birth, and never goes off. This jaundice, and the impression of the air, however, are only the occasional, and not the primary causes of blackness; for it has been observed, that the children of Negroes, as soon as they come into the world, have black genitals, and a black spot at the root of their nails. The action of the air, and the jaundice, may, perhaps, help to expand this colour; but it is certain, that the rudiments

* Hist. de l'acad. des sciences, année 1702, p. 32.

rudiments of blackness are communicated to them by their parents; that, in whatever part of the world a Negro is brought forth, he will be equally black as if he had been born in his own country; and that, if there is any difference in the first generation, it is so small as not to be perceptible. This fact, however, implies not that the colour will continue the same after many successive generations. On the contrary, there are many reasons for presuming, that, as this colour is originally the effect of a long continued heat, it will be gradually effaced by the temperature of a cold climate; and, consequently, that if a colony of Negroes were transplanted into a northern province, their descendants of the 8th, 10th, or 12th generation, would be much fairer, and perhaps as white as the natives of that climate.

Anatomists have inquired into the seat of this black colour. Some of them alledge, that it neither resides in the skin nor scarf-skin, but in the cellular membrane between them*; that this membrane, after long maceration in hot water, retains its original blackness; but that the skin and scarf-skin appear to be as white as those of other men. Dr Town, and some others, have maintained, that the blood of the Negroes is black, and that their blackness originates entirely from their blood†. I am much inclined to

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* Hist. de l'acad. des sciences, année 1702, p. 32.

† See Dr Town's letter to the Royal Society.

believe this fact; for I have observed, that, among us, the blood of those persons who have tawny, yellowish, or brown complexions, is blacker than that of those who are fairer. M. Barrere, who seems to have examined this subject most minutely *, tells us, and M. Winslow agrees with him †, that the scarf-skin of Negroes is black; and, though its extreme thinness and transparency may make it appear white, that it is really as black as the blackest horn, when reduced to the same degree of thinness. They also assure us, that the skin of the Negroes is of a reddish brown colour, approaching to black. This colour of the Negroes, according to Barrere, is produced by their bile, which he affirms, from several dissections he made in Cayenne, instead of yellow, to be as black as ink. The bile, when absorbed and dispersed through the body, tinges the skin of white people yellow; and, if it were black, it would probably produce a black colour. But, as soon as the effusion of the bile ceases, the skin resumes its natural whiteness. We must, therefore, suppose, that the bile of the Negroes is perpetually effused, or, as Barrere alledges, that it is so abundant as to be naturally secreted in the scarf-skin, and to tinge it of a black colour. Upon the whole, it is probable, that both the bile and blood of Negroes are browner than those of white people, as their

* Differt. sur la couleur des Negres, par M. Barrere.

† Expos. anatom. du corps humain, par M. Winslow, p. 489.

their skin is likewise blacker. But one of these facts cannot be admitted to prove the cause of the other; for, if the blackness of the blood or bile be allowed to give the same colour to the skin, then, instead of demanding why the skin of Negroes is black, we ought to ask why their blood or their bile are of that colour? This species of false reasoning, in place of solving the question, renders it still more intricate. For my own part, it has always appeared to me, that the same cause which makes our complexions brown, after being exposed to the action of the air, and to the rays of the sun, which renders the Spaniards more brown than the French, and the Moors than the Spaniards, also renders the Negroes blacker than the Moors. Besides, I am not here inquiring how this cause acts; I only mean to ascertain that it does act, and that its effects are more perceptible in proportion to its strength and time of acting.

The heat of the climate is the chief cause of blackness among the human species. When this heat is excessive, as in Senegal and Guiney, the men are perfectly black; when it is a little less violent, the blackness is not so deep; when it becomes somewhat temperate, as in Barbary, Mogul, Arabia, &c. the men are only brown; and, lastly, when it is altogether temperate, as in Europe and Asia, the men are white. Some varieties, indeed, are produced by the mode of living. All the Tartars, for example, are tawny,

ny, while the Europeans, who live under the same latitude, are white. This difference may safely be ascribed to the Tartars being always exposed to the air; to their having no cities or fixed habitations; to their sleeping constantly on the ground; and to their rough and savage manner of living. These circumstances are sufficient to render the Tartars more swarthy than the Europeans, who want nothing to make life easy and comfortable. Why are the Chinese fairer than the Tartars, though they resemble them in every feature? Because they are more polished; because they live in towns, and practice every art to guard themselves against the injuries of the weather; while the Tartars are perpetually exposed to the action of the sun and air.

But, when the cold becomes extreme, it produces effects similar to those of violent heat. The Samoiedes, the Laplanders, and the natives of Greenland, are very tawny. We are even assured, that some of the Greenlanders are as black as the Africans. Here the two extremes approach each other: Great cold and great heat produce the same effect upon the skin, because each of these causes acts by a quality common to both; and this quality is the dryness of the air, which, perhaps, is equally great in extreme cold as in extreme heat. Both cold and heat dry the skin, and give it that tawny hue which we find among the Laplanders. Cold contracts all the productions of nature. The Laplanders, accordingly, who
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are perpetually exposed to the rigours of frost, are the smallest of the human species. Nothing can afford a stronger example of the influence of climate than this race of Laplanders, who are situated, along the whole polar circle, in an extensive zone, the breadth of which is limited by nothing but the excessive coldness; for that race totally disappears, whenever the climate becomes a little temperate.

The most temperate climate lies between the 40th and 50th degree of latitude, and it produces the most handsome and beautiful men. It is from this climate that the ideas of the genuine colour of mankind, and of the various degrees of beauty, ought to be derived. The two extremes are equally remote from truth and from beauty. The civilized countries, situated under this Zone, are Georgia, Circassia, the Ukraine, Turkey in Europe, Hungary, the south of Germany, Italy, Switzerland, France, and the northern part of Spain. The natives of these territories are the most handsome and most beautiful people in the world.

The climate may be regarded as the chief cause of the different colours of men. But food, though it has less influence upon colour, greatly affects the form of our bodies. Coarse, unwholesome, and ill-prepared food, makes the human species degenerate. All those people who live miserably, are ugly and ill-made. Even in France, the country-people are not so beautiful

as those who live in towns; and I have often remarked, that, in those villages where the people are richer and better fed than in others, the men are likewise more handsome and have better countenances. The air and the soil have great influence upon the figure of men, beasts, and plants. In the same province, the inhabitants of the elevated and hilly parts, are more active, nimble, handsome, ingenious, and beautiful, than those who live in the plains; where the air is thick and less pure. In France, it is impossible to perpetuate the race of Spanish or Barbary horses: They degenerate even in the first generation, and, in the third or fourth, unless the breed be crossed by the importation of fresh stallions, they become altogether French horses. The effects of climate and of food upon animals are so well known, that we need hardly mention them: And, though their operation is slower and less apparent upon men; yet, from analogy, we ought to conclude, that their effects are not less certain, and that they manifest themselves in all the varieties we find among the human species.

Upon the whole, every circumstance concurs in proving, that mankind are not composed of species essentially different from each other; that, on the contrary, there was originally but one species, who, after multiplying and spreading over the whole surface of the earth, have undergone various changes by the influence of climate, food, mode of living, epidemic diseases, and the mixture

mixture of dissimilar individuals; that, at first, these changes were not so conspicuous, and produced only individual varieties; that these varieties became afterwards specific, because they were rendered more general, more strongly marked, and more permanent, by the continual action of the same causes; that they are transmitted from generation to generation, as deformities or diseases pass from parents to children; and that, lastly, as they were originally produced by a train of external and accidental causes, and have only been perpetuated by time and the constant operation of these causes, it is probable that they will gradually disappear, or, at least, that they will differ from what they are at present, if the causes which produced them should cease, or if their operation should be varied by other circumstances and combinations.

DISSERTATION

ON THE

NATURE of ANIMALS.

ALL our knowledge is derived from comparing the relations and discrepancies which subsist between different objects. If brute animals had no existence, the nature of man would be still more incomprehensible. Having formerly considered man as a detached being, let us now institute a comparison between him and the other animals. Let us examine the nature of the animal world; let us investigate their organization, and study their general oeconomy. This inquiry will enable us to draw particular inferences,

ferences, to discover relations, to reconcile apparent differences, and, from a combination of facts, to distinguish the principal effects of the living machine, and lead us to that important science, of which man is the ultimate object.

I shall begin with explaining the subject, and by reducing it to its just limits.

The general properties of matter, being common to animated as well as inanimated beings, belong not to our subject *. The qualities possessed by plants as well as animals, ought likewise to be rejected. It is for this reason that we have treated of nutrition, of growth, of reproduction, and even of generation, properties common to the plant and animal, before entering upon those qualities which are peculiar to, and constitute animated bodies.

In the next place, as many beings are comprehended in the class of animals, whose organization differs greatly from that of man, and the more perfect animals, we shall likewise keep these out of our view, and examine such only as make the nearest approaches to ourselves.

But, as man is not a simple animal, and as his nature is superior to that of other animals, we shall endeavour to investigate the cause of this superiority, in order that we may be enabled to distinguish what is peculiar to him, from what he possesses in common with other animated beings.

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* See above, Vol. II. Chap. I.

Having thus circumscribed our subject, and lopt off its extremities, we shall proceed to the general division of it. Before giving a detail of the various parts, and of their functions, let us attend to the general results of the animal machine; and, before reasoning upon the causes, let us enumerate and describe the effects.

An animal is distinguished by two modes of existence, that of motion, and that of rest, which alternately succeed one another during the whole of life. In the former, all the springs of the machine are in action; in the latter, all is at rest, excepting one part, and that part acts equally when the animal is asleep and when it is awake. This part, therefore, is absolutely necessary, since the animal cannot exist in any manner without it. This part is likewise independent of the other, because it can act alone; and the other part depends upon this, because it cannot act without its assistance. The one is a fundamental part of the animal oeconomy, because it acts continually, and without interruption; the other is less essential, because it acts only by alternate intervals.

This first division of the animal oeconomy is general, and seems to be well founded. It is not so difficult to examine an animal when asleep, as when awake and in action. This distinction is essential, and not a simple change of condition, as in an inanimated body, which is equally indifferent to rest or motion; for an inanimated body would continue perpetually in either

either of these states, unless it were constrained to change, by the application of some impelling or resisting force. But an animal changes its state by its own proper powers. It passes naturally, and without restraint, from motion to rest, and from rest to motion. The moment of awaking returns as necessarily as that of sleep, and both happen independent of foreign causes; because the animal can exist during a certain time only in either state; and continued walking or sleeping would be equally fatal to life.

The animal oeconomy, then, may be divided into two parts; the first of which acts perpetually without any interruption, and the second acts by intervals only. The action of the heart and lungs, in animals which respire, and the action of the heart in the foetus state, constitute the former; and the action of the senses, joined to the movements of the members, constitute the latter.

If we conceive the existence of beings endowed by Nature with this first part of the animal oeconomy only, though deprived of sense and progressive motion, they would still be animated, and would differ in nothing from animals asleep. An oyster, or a zoophyte, which appear not to possess either external senses, or the power of progressive motion, are animals destined to sleep continually. A vegetable, in this view, is a sleeping animal: And, in general, every organized being, deprived of sense and motion, may
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be compared to an animal constrained by Nature to perpetual sleep.

Sleep, in the animal, therefore, is not an accidental state induced by the exercise of its functions while awake: It is, on the contrary, an essential mode of existence, and serves as a basis to the animal oeconomy. Our being commences with sleep; the foetus sleeps perpetually; and the infant consumes most of its time in that state.

Sleep, therefore, which appears to be a state purely passive, a species of death, is, on the contrary, the original condition of animated beings, and the very foundation of life itself. It is not a privation of certain qualities and exertions, but a real and more general mode of existence than any other. With sleep our existence commences: All organized beings, which are not endowed with senses, remain perpetually in this condition; none exist in continued action; and the existence of every animal consists more or less of this state of repose.

If the most perfect animal were reduced to that part alone which acts perpetually, it would not differ, in appearance, from those beings to which we can hardly ascribe the name of Animal. With regard to external functions, it would have a striking resemblance to a vegetable; for, though the animal and vegetable differ in external organization, they both exhibit the same results: They both receive nourishment,
grow,

grow, expand, and are endowed with internal movements and a vegetating life. On this supposition, they would be equally deprived of progressive motion, action, and sentiment; and they would have no external or apparent character of animation. But, if this internal part be clothed with a proper cover, or, in other words, if it be endowed with senses and members, animal life will instantly manifest itself; and, in proportion to the quantity of sense and members contained in this cover, the animation will be more complete, and the animal more perfect. It is this envelope or cover, therefore, which constitutes the distinction between different animals. The internal part, which is the basis of the animal oeconomy, is common to every animated being, without exception; and, as to its mode, it is nearly the same in man and in all animals which consist of flesh and blood. But the external cover is exceedingly diversified, and the greatest differences originate from the extremities of this cover.

To illustrate this subject, let us compare the body of a man with that of a horse, an ox, &c. The internal part, which acts perpetually, namely the heart and lungs, or the organs of circulation and respiration, is nearly the same in man and in the animal. But the external cover is extremely different. The solids of the animal's body, though composed of parts similar to those of the human frame, differ prodigiously in number,

number, magnitude, and position. The bones are more or less shortened, rounded, lengthened, flattened, &c. Their extremities are more or less elevated, or hollowed; and several of them are sometimes united into one. Some, as the clavicles, are entirely wanting; the number of others is augmented, as the cartilages of the nose, the vertebrae, the ribs, &c. Of others, the number is diminished, as the bones of the carpus, metacarpus, tarsus, metatarsus, phalanges, &c. which give rise to great varieties in the figure of animals, compared with that of the human body.

We will be still farther convinced, that the principal distinctions between the body of man, and those of the other animals, arise from the extremities, if we attend to the following circumstances. Let us divide the body into three principal parts, the trunk, the head, and the members. The head and members, which are the extremities of the body, constitute the chief differences between man and the other animals. By examining these three principal parts, we find that the greatest differences in the trunk are found at its superior and inferior extremities; for the animals have no clavicles on the superior extremity of the trunk, and the inferior is terminated by a tail, which consists of a certain number of external vertebrae, which exist not in man. In the same manner, the inferior extremity of the head, or jaw-bones, and the superior,

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or frontal bone, differ widely in man and the quadrupeds: The jaw-bones of most animals are greatly lengthened, and their frontal bones, on the contrary, are contracted. In fine, by comparing the members of a brute with those of a man, it is easy to perceive that they differ chiefly in their extremities; for, at the first glance of the eye, nothing has less resemblance to the human hand, than the foot of a horse or an ox.

Regarding the heart, therefore, as the centre of the animal machine, it is obvious that man resembles the other animals in this and the neighbouring parts; and that the farther from this centre, the differences become more considerable, till we arrive at the extremities, where they are by much the greatest. But, where this centre, or the heart itself, differs, then the animal is infinitely removed from man, and possesses nothing in common with the creatures under consideration. In most insects, for example, the organization of this principal part of the animal oeconomy is singular. Instead of a heart and lungs, we find parts which perform similar functions, and for that reason have been regarded as analogous to those viscera, but which, in reality, are very different, both in their structure, and in the result of their action. Insects, accordingly, differ as much as possible from man and the quadrupeds. A slight variation in the central parts is always accompanied with an amazing difference.

ence, in the external configuration. The heart of a turtle is of a singular structure; and its figure is so extraordinary, that it has no resemblance to any other creature.

In contemplating men, quadrupeds, birds, fishes, and reptiles, what a prodigious variety occurs in the figure and proportion of their bodies, in the number and position of their members, in the substance of their flesh, bones, and integuments? The quadrupeds have tails and horns; and all their extremities differ remarkably from those of man. The cetaceous animals live in a different element; and, though they generate in a manner similar to the quadrupeds, their figure is extremely different, being totally deprived of inferior extremities. The birds differ still more from man, by their beak, their feathers, their flying, and their multiplication by means of eggs. The fishes and amphibious animals are still farther removed from the human figure; and the reptiles are entirely destitute of members. Thus we find, that the greatest diversity consists in the envelope or external cover, the internal structure, on the contrary, being nearly the same: All animals are furnished with a heart, a liver, a stomach, intestines, and organs of generation. These, therefore, ought to be regarded as the most essential parts of the animal oeconomy, because they are the most constant, and least subjected to variation.

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But it is worthy of remark, that, even in this cover, some parts are more constant than others. None of these animals are deprived of all the senses. In treating of the senses, we explained what might be their species of feeling. We know not the nature of their smelling and taste; but we are certain, that they are all endowed with the sense of seeing, and perhaps also with that of hearing. The senses, therefore, may be considered as another essential part of the animal oeconomy, as well as the brain, which is the origin of all sensation. Even the insects, which differ so much in their central parts from other animals, have something analogous to a brain, and its functions are similar to those of the other animals: And those animals, as the oyster, which seem to be deprived of a brain, ought to be regarded as beings only half animated, and as forming the shade between animal and vegetable life.

Thus we have discovered the brain and the senses to be a second essential part of the animal oeconomy. The brain is the centre of the envelope or cover, as the heart is the centre of the internal part of the animal. It is from the brain that the external parts receive their power of moving and acting, by means of the spinal marrow and the nerves, which are only prolongations of this marrow. And, as the heart and the whole interior parts communicate with the brain and ex-

ternal cover, by means of the distribution of blood-vessels, the brain has a similar communication with the internal parts by the ramifications of the nerves. This union is intimate and reciprocal; and, though the functions of the two organs be totally different, they cannot be separated, without instant destruction to the animal.

The heart, and the whole internal parts, act continually, without the smallest interruption, and independent of external causes. But the senses and envelope act only by alternate intervals, and successive vibrations excited by external causes. Objects act upon the senses, and this action is modified by the senses, and transported, in this modified form, to the brain, where the impression first receives the appellation of Sensation: The brain, in consequence of this impression, acts upon the nerves, and communicates the vibrations it receives; and these vibrations produce progressive motion, and all the other external actions of the body. When a body is acted upon by any cause, it is well known, that the body re-acts upon the cause. Thus objects act upon animals by means of the senses, and animals re-act upon objects by their external movements; and, in general, action is the cause, and re-action the effect.

The effect, it may be said, is not, in this case, proportioned to the cause: In solid bodies, which follow the laws of mechanism, action and re-action are always equal. But, in the animal body,

body, re-action, or external motion, seems to be incomparably greater than action; and, consequently, progressive motion, and the other external movements, ought not to be regarded as simple effects of the impressions of objects upon the senses. To this objection I reply, that, though effects, in certain circumstances, appear to be proportioned to their causes; yet there are in nature innumerable instances where the effects have no proportion to their apparent causes. A single spark of fire will inflame a magazine of powder, and blow up a citadel. A slight friction produces, by electricity, a concussion so violent, that it is communicated to great distances, and affects equally a thousand persons at the same time. It is not, therefore, surprising that a slight impression on the senses should produce a violent re-action in the animal body, manifesting itself by external movements.

Causes which admit of measurement, and the quantity of whose effects can be exactly estimated, are not so numerous as those whose qualities and manner of acting are perfectly unknown; and, consequently, the proportion they may have to their effects must be equally unknown. To measure a cause, it must be simple; its action must be constant, and uniformly the same, or, at least, it must vary only according to a known law. Now, most effects in nature are produced by a combination of different causes, the action of which varies, and which observe no constant law;

law; and, of course, they can neither be measured, nor estimated, but by endeavouring to approach the truth by probable conjectures.

I pretend not, therefore, to lay it down as a demonstrated fact, that progressive motion, and the other external movements of animals, have no other cause but that of the impressions of objects upon the senses. I only say, that the fact is probable, and seems to be founded on strong analogies: For I find, that all organized beings, which are deprived of senses, are likewise deprived of the power of progressive motion, and that all those which are endowed with senses, enjoy likewise the loco-motive faculty. I also find, that this action of objects upon the senses often makes the animal move instantaneously, and even involuntarily; and that, when the movement is determined by the will, it is always the effect either of the immediate action of objects upon the senses, or of the remembrance of a former impression.

To render this matter more clear, let us analyze the physical laws of our own actions. When an object strikes any of our senses, and produces an agreeable sensation, and, of course, a desire, this desire must have a relation to some quality or mode of our enjoyment. We cannot desire an object in any other way than to have an inclination to see, hear, taste, smell, or touch it; and this desire is only to gratify more fully either that sense with which we perceive the object, or some
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of our other senses at the same time; or, in other words, to heighten the agreeableness of the first sensation, or to excite another, which is a new mode of enjoying an object: For, the moment we perceive our object, if we could fully enjoy it by all the senses at once, we would have nothing to desire. Desire, then, originates from our being ill situated with regard to the object perceived. We are either too near or too distant from it. We, therefore, naturally change our situation; because, at the same time that we perceive the object, we also perceive the obstruction to the full enjoyment of it, arising from the distance or proximity of our situation. Hence the movements we perform in consequence of desire, and the desire itself, proceed entirely from the impression made by the object upon our senses.

When we perceive an object with the eye, and have an inclination to touch it, if it be near, we seize it with our hand, and, if at a distance, we move forward in order to approach it. A man, when deeply occupied with study, if he be hungry, will lay hold of bread which he feels under his hand, and even carry it to his mouth and eat it, without being conscious of his having acted in this manner. These motions necessarily result from the first impression made by the object; and they would never fail to succeed the impression, if this natural effect were not opposed by other impressions, which, by acting at the same

same time, often weaken and efface the action of the first.

An organized being, therefore, without sensation, as an oyster, which probably enjoys the sense of feeling very imperfectly, is deprived not only of progressive motion, but of sentiment and intelligence; because each of them would equally excite desire, and this desire would manifest itself by external movements. I am uncertain whether beings deprived of senses have any perception of their own existence; if they have, it must be very imperfect, since they are unable to perceive the existence of others.

To illustrate this subject still farther, let us suppose a man, at the moment he wishes to approach an object, suddenly deprived of all his members, would he not endeavour to trail his trunk along the ground in order to gratify his desire? Nay, were he reduced to a globular form, and actuated by the same desires, though deprived of every faculty of motion, he would still exert all his force to obtain a change of situation: But, on this supposition, as he could only act against the point that supported him, he would still evince his passion by raising his body. Thus external and progressive motion depend not on the organization and figure of the body, since, whatever be the confirmation of any being, if endowed with senses and a desire of gratifying them, it would not fail to move.

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The facility, the quickness, the direction, and the continuation of motion, depend, it is true, upon external organization: But the cause, principle, and determination of it, proceed solely from desire, excited by the impression of objects upon the senses; for, if a man were deprived of sight, he would make no movement to gratify his eyes. The same thing would happen if he were deprived of any of the other senses; and, if deprived of every sense, he would remain perpetually at rest; and no object would excite him to move, though, by his external conformation, he were fully capable of motion.

Natural wants, as that of taking nourishment, are internal movements, which necessarily excite desire or appetite. These movements may produce external motion in animals; and, provided they are not entirely deprived of external senses, relative to these wants, they will act in order to supply them. Want is not desire; the former differs from the latter as cause differs from effect; desire, therefore, cannot be produced without the intervention of senses. Whenever an animal perceives an object fitted to supply its wants, desire is instantly excited, and action or motion succeeds.

The action of external objects must necessarily produce some effect; and it is easy to perceive that this effect is animal motion, since every time the senses are struck in the same manner, the same movements uniformly succeed. But how does

does the action of objects excite desire or aversion? How shall we obtain a clear conception of the operation of that principle to which the senses communicate their notices? The senses are only the middle term between the action of objects and animal action. This principle, however, has the power of determining all our motions; for it can modify and alter the animal action, and even sometimes counteract it, notwithstanding the impression of objects.

With regard to man, whose nature is so different from that of other animals, this question is difficult to solve; because the soul participates all our movements; and it is not easy to distinguish the effects of this spiritual substance from those produced solely by the material part of our frame. Of this we can form no judgment but by analogy, and by comparing our actions to the natural operations of the other animals. But, as this spiritual substance has been conferred on man alone, by which he is enabled to think and reflect, and, as the brutes are purely material, and neither think nor reflect, and yet act, and seem to be determined by motives, we cannot hesitate in pronouncing the principle of motion in them to be perfectly mechanical, and to depend absolutely on their organization.

I apprehend, therefore, that, in the animal, the action of objects on the senses produces another on the brain, which I consider as a general internal sense, that receives all the impressions

sions transmitted to it by the external senses. This internal sense is not only susceptible of vibrations from the action of the senses, but is capable of retaining, for a long time, the vibrations thus excited; and it is the continuation of these vibrations that constitute impressions, which are more or less deep, in proportion to the duration of the vibrations.

The internal sense, therefore, differs, in the *first* place, from the external senses by the faculty which it possesses of receiving every species of impression; while the external senses are only affected in one mode, corresponding to their conformation: The eye, for instance, is not more affected with sound than the ear with light. *2dly*, The internal sense differs from the external senses, by the duration of the vibrations excited by external causes. In every other article, both these species of senses are of the same nature. The internal sense of a brute, as well as its external senses, are pure results of matter and mechanical organization. Like the animal, man possesses this internal material sense; but he is likewise endowed with a sense of a very different and superior nature, residing in that spiritual substance which animates us, and superintends our determinations.

Hence the brain of an animal is a general sense, which receives all impressions transmitted to it by the external senses; and these impressions or vibrations continue longer in the internal

than the external senses. Of this we may easily form a conception, since the duration of impressions, even on the external senses, is very different. The impression of light on the eye is well known to last much longer than that of sound on the ear. A rapid succession of sounds can be heard distinctly; but a succession of colours equally rapid confounds the eye. It is for this reason that the vibrations transmitted to the internal sense by the eye are stronger than those conveyed by the ear, and that we describe objects which we have seen in a more lively manner than those we have heard. The vibrations excited by objects on the eye seem to continue longer than those made upon any of the other senses; and, therefore, it appears to participate more of the nature of the internal sense. This might be proved by the quantity of nerves expanded on the eye; for it alone receives nearly as many as the three organs of hearing, smelling, and tasting.

The eye, therefore, may be regarded as a continuation of the internal sense. It consists, as was remarked in another place, almost entirely of nervous fibres, and is only a prolongation of the organ in which the internal sense resides. It is not, of course, surprising that it should make the nearest approach to this internal sense. Its impressions are not only more durable, but, like the internal sense, it possesses powers

powers of a nature superior to those of the other senses.

The eye exhibits external marks of internal impressions. It expresses desire or aversion excited by agreeable or disagreeable objects. Like the internal sense, it is active; but all the other senses are purely passive: They are simple organs, destined for the reception of external impressions, but incapable of preserving or reflecting them.

When any of the senses, it must be allowed, are long and strongly acted upon, the vibrations continue some time after the action of the object has ceased. But the eye possesses this power in a supereminent degree; and it is only exceeded by the brain, which not only preserves the impressions received, but propagates their action by communicating vibrations to the nerves. The external organs of sense, the brain, the spinal marrow, and the nerves, which are expanded over the whole body, ought to be regarded as one continued mass, as an organic machine, of which the senses are the parts to which the action of external objects is applied. The brain is the fulcrum or basis; and the nerves are the parts which receive motion from the acting powers. But what renders this machine different from all others is, that its fulcrum not only resists and re-acts, but is even active itself; because it long retains received impressions. And, as this internal sense, the brain and its membranes,

branes, is very large, and endowed with great sensibility, it can admit many successive and contemporary vibrations, and retain them in the same order they were received; because each impression communicates vibrations to one part only of the brain, and successive impressions affect the same part, or contiguous parts, in a different manner.

If we suppose an animal deprived of a brain, but endowed with an external sense of great extent and sensibility, as an eye, for example, having a retina as large as the brain, and possessing the faculty of retaining received impressions; it is certain, that an animal of this kind, would see, at the same time, both present objects, and those which it had formerly seen; because, on this supposition, the vibrations always remaining, and the extent of the retina being large enough to receive them on different parts, the animal would perceive, at the same time, both present and past objects; and would, therefore, be mechanically determined to act according to the number or force of the vibrations produced by the images, corresponding with, or opposite to this determination. If the number of images fitted to excite desire surpassed those suited to produce aversion, the animal would necessarily be determined to move, in order to gratify this appetite: But, if the number and force of different images were equal, the animal, having no superior motive, would remain at rest. I say, that all this
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would happen mechanically, and without the intervention of memory; for, by seeing and being acted upon by all the images at the same time, those which correspond with desire would be opposed by those that correspond with aversion, and from this equilibrium, or from the excess in number or force of one set of images above another, the animal could alone be determined to rest or to action.

From these facts it appears, that, in brutes, the internal sense differs only from the external senses, by the faculty it possesses of retaining received impressions. This faculty is alone sufficient to explain all the actions of animals, and to give us some idea of what passes within them. It likewise demonstrates the essential and infinite difference between them and us, and, at the same time, enables us to distinguish what we possess in common with them.

Animals have some senses of exquisite acuteness; but, in general, they are not all equal to those of man: And, it is worthy of remark, that the degrees of excellence in the senses follow not the same order in the brute, as in the human species. The sense most analogous to thinking is that of touch; and this sense is more perfect in man than in the other animals. The sense of smelling is most analogous to instinct and appetite; and the brute enjoys it in a superior degree. Hence man should excell in knowledge, and the brute in appetite. In man, the first

first sense for excellence is touching, and smelling is the last: In the brute, the sense of smelling is the first, and that of touching is the last. This difference has a perfect correspondence to the nature of each. The sense of seeing is exceeding imperfect and delusive, without the aid of that of touching; and the former, accordingly, is less perfect in the brute than in man. The ear, though perhaps equally well constructed in the animals as in man, is not nearly so useful to them, because they are deprived of speech, which, in man, depends on the ear, an organ which gives activity to this sense, and enables him to communicate his ideas: But hearing, in the brute, is a sense almost entirely passive. Hence man enjoys the senses of touching, seeing, and hearing, more perfectly, and that of smelling more imperfectly, than the animal; and, as taste is an internal smelling, and is more analogous to appetite than any of the other senses, the animals also possess it in a superior degree, as appears from their invincible aversion against certain aliments, and their natural appetite for such as correspond to their constitutions: But man, if he were not instructed, would eat the fruit of the mancinella like an apple, and the hemlock-like parsley.

The excellence of the senses is the gift of nature; but art and habit may bestow on them a greater degree of perfection. A musician, whose ear is accustomed to harmony, is shocked with discord:

discord: A painter, with one glance of his eye, perceives a number of shades which escape a common observer. The senses and even the appetites of animals may also be improved. Some birds learn to sing, and to repeat words; and the ardor of a dog for the chase may be increased by rewarding him for his labours.

But this excellence and improvement of the senses are most conspicuous in the brute, who always appears to be more active and intelligent in proportion to the perfection of his senses. Man, on the contrary, has too great a portion of reason and genius to bestow much attention to the improvement of his ear or his eye. Persons who are short-sighted, dull of hearing, or insensible of smell, suffer not, for that reason, any diminution of capacity: An evident proof that man is endowed with something superior to an internal animal sense, which is a material organ, similar to the external organs of sensation, and differs from them only by the faculty of retaining received impressions. But the soul of man is a superior sense, or spiritual substance, totally different, both in its action and essence, from the nature of the external senses.

We mean not, however, to maintain that man is not possessed of an internal material sense, analogous to the external senses. Inspection alone is sufficient to establish this point. In man, the brain is proportionally larger than in any other animal, which is an evident proof of his being

being endowed with this internal material sense. What I mean to inculcate, is, that this sense is infinitely superior to the other. It is subject to the commands of the spiritual substance, which, at pleasure, suppresses, or gives rise to all its operations. In the animal, this sense is the principle which determines all its movements; but, in man, it is only an intermediate and secondary cause of action.

But, let us examine more closely the powers of this internal material sense. When we have once fixed the extent of its action, every thing beyond this limit must, of necessity, originate from the spiritual sense, and we will be furnished with a criterion for distinguishing what we possess in common with the other animals, and in what articles we excell them.

The internal material sense receives indifferently every impression conveyed by the external senses. These impressions proceed from the action of objects, and quickly pass through the external senses, where they only excite momentary vibrations. But their progress stops at the brain, and produce, in this organ of the internal sense, vibrations which are both distinct and durable. These vibrations give rise to desire or aversion, according to the present state and disposition of the animal. Immediately after birth, the young animal begins to respire, and to feel a desire for food. The organ of smelling receives the effluvia of the milk contained in the dugs of the mother.

mother. Vibrations are excited in this sense by the odorous particles, and these vibrations are transmitted to the brain, which, in its turn, acts upon the nerves; and the animal is thus stimulated to make the proper movements, or, in other words, to open its mouth, in order to procure the nourishment desired. The senses peculiar to appetite being more obtuse in man than in the brutes, the new-born child feels only the desire of taking nourishment, which he announces by crying. But he is incapable of procuring it himself; neither is he stimulated by the sense of smelling; his mouth must be applied to the breast, before he can use the means of gratifying his appetite. Then, indeed, the senses of smelling and of touching communicate vibrations to the brain, which, by re-acting on the nerves, stimulates the child to make the necessary motions for receiving and sucking the milk. It is only by the senses of appetite, namely, those of smelling or tasting, that the brute animal is apprised of the presence of nourishment, or of the place where it is to be found. Its eyes are not yet open; and, though they were, they would not, at first, be capable of determining it to use the proper efforts. The eye, which is a sense more analogous to intelligence than to appetite, is open in man from the moment of birth; but remains shut, in most other animals, for several days. The senses of appetite, on the contrary, are more perfect and mature in the young

animal than in the infant. This affords another proof, that, in man, the organs of appetite are less perfect than those of intelligence; and that, in the animal, the organs of intelligence are more imperfect than those of appetite.

The same remark may be made with regard to progressive motion, and all the other external movements. It is long before the infant can use its members, or has strength enough to change place. But a young animal soon acquires these faculties. These powers, in the animal, are all relative to appetite, which is vehement, quickly unfolded, and the sole principle of motion. But appetite, in man, is feeble, long before it is unfolded, and ought not to have such influence, as intelligence, upon the determination of his movements. Man, therefore, is, in this respect, later in arriving at maturity.

Hence, every circumstance, even in physics, concurs in demonstrating that the brutes are actuated by appetite only, and that man is influenced by a superior principle. The only doubt that remains is the difficulty of conceiving how appetite alone should produce, in animals, effects so similar to those produced in men by intelligence; and how to distinguish the actions we perform in consequence of our intellectual powers, from those which originate from the force of appetite. I despair not, however, of being able to remove this difficulty.

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The internal material sense, as formerly remarked, retains, for a long time, the vibrations it receives. This sense, the organ of which is the brain, is common to every animal, and receives impressions transmitted to it by each of the external senses. When an object acts upon the senses, this action produces lasting vibrations in the internal sense, and these vibrations communicate motion to the animal. When the impression proceeds from the senses of appetite, the movement is determined, the animal either advances to lay hold of the object, or flies to avoid it. This motion may be uncertain, when the impression is transmitted by the senses analogous to intelligence, as the eye, and the ear. When an animal sees or hears for the first time, he feels the impression of light or of sound; but the motions produced must be uncertain, because these senses have no relation to appetite. It is only by repeated acts, and after the animal has joined to the impressions of seeing or hearing those of smelling, tasting, or touching, that he feels a determination to approach or retire from objects which experience alone renders analogous to his appetite.

To illustrate this subject, let us examine the conduct of an animal that has been instructed by man. A dog, for example, though excited by the most violent appetite, will not venture to wrest, from the hand of his master, the object that would gratify him; but he, at the same time,

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makes a number of movements in order to obtain it. Does not the dog, in this case, seem to combine ideas ? Does he not appear to desire, and to fear, in a word, to reason nearly in the same manner as a man, when violently tempted to take what belongs to another, but is restrained by the fear of punishment ? This is the vulgar mode of accounting for the conduct of animals. We naturally transfer our own motives to animals, when placed in similar circumstances ; and the analogy is said to be well founded, because in man, and in the animal, the conformation of both the internal and external senses is similar. Though this analogy, however, were just, is not something more required ? Is it not necessary that the animals should, on some occasions, do every thing which we perform ? But the contrary is evident ; Animals never invent, nor bring any thing to perfection ; of course, they have no reflection ; they uniformly do the same things in the same manner. This destroys the force of the analogy so much, that we may even doubt of its reality : We ought, therefore, to inquire, whether the actions of brutes proceed not from principles entirely different from those which actuate men, and whether their senses alone are not sufficient to produce their actions, without the necessity of ascribing to them the powers of reflection.

Their internal sense is strongly agitated by every thing that relates to their appetites. A
dog

dog would instantly seize the object he desires, if his internal sense retained not impressions of pain, that had formerly accompanied this action. But the animal has received new qualities from external impressions: This prey is not presented to a simple dog, but to a dog that has been beat: Every time he implicitly obeyed the dictates of appetite, has been followed with blows: The impressions of pain, therefore, uniformly accompany those of appetite, because they have always been made at the same time. The animal being thus acted upon at once by two contrary impulses, which mutually destroy each other, he remains in equilibrio, between two equal powers. The cause determining him to motion being counterbalanced, he makes no effort to obtain the object of his desire. But, though the vibrations occasioned by appetite and aversion, or by pleasure and pain, destroy the effects of each other, a third vibration, which always accompanies the other two, is renewed in the brain of the animal, by the action of his master, from whose hand he has often received his food: And, as this third vibration is not counterbalanced by any opposite power, it becomes a cause sufficient to excite motion. The dog is, therefore, determined to move towards his master, and to frisk about till his appetite be fully gratified.

In the same manner, and upon the same principles, may all the actions of animals, however complicated they appear, be explained, without

the necessity of attributing to them either thought or reflection. Their internal sense is sufficient to produce every motion they perform. One thing only remains to be illustrated, and that is the nature of their sensations, which, according to the present doctrine, must be very different from ours. Have the animals, it may be asked, no knowledge, no sentiment, or no consciousness of their existence? Since you pretend to explain all their actions by mechanism, do you not reduce them to mere machines, or insensible automatons?

If I have properly explained myself, the reader ought to perceive, that, so far from depriving animals of all powers, I have already allowed them the possession of every thing but thought and reflection. Their feelings are even more exquisite than ours. They are conscious of their actual or present existence; but they have no knowledge of that existence which is past. They have sensations; but they want the faculty of comparing them, or of forming ideas; for ideas are only the results of the association or comparison of sensations.

Let us consider each of these articles separately. The feelings of animals are more exquisite than those of man. This, I imagine, has already been sufficiently proved by what was remarked concerning the excellence of their senses relative to appetite; by their natural and invincible aversion against certain objects, and their uniform

uniform and determined attachment to others; and by their faculty of instantly distinguishing with certainty what is salutary or noxious. Animals, therefore, as well as men, are capable of pleasure and pain. They have no knowledge of good and evil; but they feel the distinction. Whatever is agreeable to them is good, and whatever is disagreeable is bad. Both are only relations conformable or repugnant to their nature and organization. The pleasure of tickling, and the pain of an wound, are common to us and the animals; because they depend absolutely upon an external material cause, namely, a weaker or stronger action in the nerves, which are the organs of sensation. Every thing that acts gently on these organs gives pleasure; and every thing that acts with violence is the cause of pain. All sensations, then, are sources of pleasure, when they are temperate and natural; but, when too violent, they produce pain, which, in physics, is the extreme, rather than the opposite of pleasure.

Disagreeable sensations are excited by a light too brilliant, too near an approach to fire, loud noises, strong smells, insipid or coarse victuals, and hard friction. But a gentle light, a moderate heat, a soft sound, a delicate perfume, a fine flavour, and slight friction, produce sensations of the most agreeable kind. Thus every gentle application to the senses is pleasure, and every shock, or violent impression, is pain. As the causes,

causes, therefore, which give rise to violent impressions, occur more seldom in nature than those that produce soft and moderate movements; and as animals, by the exercise of their senses, soon acquire the habit of avoiding hurtful objects, and of distinguishing and approaching such as are agreeable to them, the sum of agreeable sensations must exceed that of the disagreeable; and therefore the quantity of pleasure must be greater than that of pain.

If animal pleasure consists of whatever flatters the senses, and if, in physics, what flatters the senses be every thing that corresponds to nature; if, on the other hand, pain be whatever wounds the organs, and is repugnant to nature; if, in a word, pleasure be physical good, and pain physical evil, it is evident, that every sentient being must enjoy more pleasure than pain; for every thing that corresponds with his nature, contributes to his preservation, or supports his existence, is pleasant; and every thing that tends to his destruction, to derange his organization, or to change his natural condition, is pain. It is by pleasure alone, therefore, that a sentient being can continue to exist; and, if the sum of agreeable sensations surpassed not that of the disagreeable, deprived of pleasure, he would first languish for want of good, and, loaded with pain, he would next perish by a superabundance of evil.

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In man, physical good and evil constitute the smallest part of his pleasures and pains. His imagination, which is never idle, is a constant source of unhappiness; for it presents to the mind nothing but vain phantoms, or exaggerated pictures. More occupied by these illusions than by real objects, the mind loses both its faculty of judging and its empire: It compares chimeras only; it sees only at second hand, and often sees impossibilities. The will, of which the mind has now no command, becomes a burden: In fine, his extravagant desires are real pains, and his vain hopes are at most but false pleasures, which vanish as soon as the mind resumes its faculty of discerning and of judging without passion.

Thus, when we search for pleasure, we create to ourselves pain; we are miserable from the moment we desire to augment our happiness. Good exists only within ourselves, and it has been bestowed on us by Nature; evil is external, and we go in quest of it. The peaceable enjoyment of the mind is our only true good: We cannot augment this good, without the danger of losing it: The less we desire, the more we possess: Whatever we wish beyond what Nature has bestowed on us is pain; and nothing is pleasure but what she offers us.

Now, pleasures innumerable are constantly presented to us by Nature: She has provided for our wants, and fortified us against pain: Physi-

cal good infinitely exceeds physical evil. It is not, therefore, realities, but chimeras, which we ought to dread. Neither bodily pain, nor disease, nor death, are formidable; but agitation of mind, the passions, and languor, are the only evils we have to apprehend.

The animals have only one mode of acquiring pleasure, the exercise of their sensations to gratify their desires. We also possess this faculty: But we are endowed with another source of pleasure, the exercise of the mind, the appetite of which is the desire of knowledge. This source of pleasure would be more pure and copious, were its current not interrupted by our passions, which destroy all contemplation. Whenever they obtain the ascendant, reason is silenced, or only makes feeble and unavailing efforts. We, of course, lose all relish of truth; the charm of illusion augments; error fortifies its dominion, and drags us on to misery: For what misery can be greater than no longer to see things as they are, to have the faculty of judging perverted by passion, to act only according to its dictates, to appear, consequently, unjust or ridiculous to others, and, lastly, to be obliged to despise ourselves, whenever we can command a moment's reflection?

In this state of darkness and illusion, we would willingly change the nature of the soul; she has been bestowed on us for the purposes of knowledge, and we would employ her only for those
of

of sensation. If we could extinguish her light entirely, instead of regretting the loss, we would envy the condition of idiots. As we only reason by intervals, and as these intervals are burdensome to us, and pass in secret reproaches, we wish to suppress them. Thus, proceeding always from illusion to illusion, we voluntarily seek to lose sight of ourselves, and to terminate the whole by forgetting our existence.

Uninterrupted passion is madness; and madness is the death of the soul. Violent passions, with intervals, are paroxysms of folly, diseases of the mind, whose danger consists in their frequency and duration. Wisdom is only the sum of these intervals of health which we enjoy between the paroxysms of passion, and this sum is not entirely made up of happiness; for we then perceive that the mind has been diseased; we accuse our passions; we condemn our actions. Folly is the germ of misery, and wisdom unfolds it. Most people who call themselves unhappy, are passionate men, or, in other words, fools, who have some intervals of reason, during which they perceive their folly, and, of course, feel their misery: And as, in the elevated conditions of life, there are more false appetites, more vain pretensions, more disordered passions, more abuse of the mind, than in the inferior, men of birth and opulence must unquestionably be the most unhappy.

But,

But, let us turn from these melancholy objects, these humiliating truths, and consider the wise man, who alone merits examination. He is both master of himself and of events. Content with his condition, he desires not to live in any other manner than he has always lived: Possessed of sufficient resources, he seldom requires the aid of others. Occupied perpetually in exercising the faculties of his mind, he improves his understanding, cultivates his genius, acquires fresh sources of knowledge; and, being neither tormented with disgust nor remorse, he enjoys the universe, by enjoying himself.

Such a man is, doubtless, the happiest being in nature. To the pleasures of the body, which he possesses in common with the other animals, he joins those of the mind, that are peculiar to him. He has two modes of being happy, which mutually aid and fortify each other; and if, by disease or accident, he be afflicted with pain, he suffers less than the fool: He is supported by the strength of his mind, and reason affords him consolation: Even in suffering pain, he has the pleasure of perceiving that he is able to endure it.

Health, in man, is more feeble and precarious than in any other animal: He is oftener sick; his sickness is of longer duration; and he dies at every age. The brutes, on the contrary, seem to run through the space allotted to their existence with firm and equal steps. This circumstance

stance appears to proceed from two causes, which, though very different, mutually contribute to produce the same effect. The first is the agitation of mind occasioned by the derangement of our internal material sense. The passions have an influence on health, and introduce disorder into the vital principles. The majority of men lead either a timid or contentious life, and most of them die of chagrin. The second is the imperfection of those of our senses which are analogous to appetite. The brute animals distinguish better what is agreeable to their nature: They are never deceived in the choice of their aliment; they never exceed in their pleasures; guided only by the perception of their actual wants, they remain satisfied, and never search for new sources of gratification. But man, independent of wishing for excess in every article, independent of that ardour with which he seeks to destroy himself by attempting to force nature, is not so alert in distinguishing the effects of particular species of food. He despises simple aliment, and prefers compounded dishes, because his taste is corrupted, and because he has converted the sense of pleasure into an instrument of debauchery, which can only be gratified by irritation.

It is not, therefore, surprising that we are more subject to diseases than the brutes, since we cannot, like them, distinguish so easily what is noxious or salutary to our frame. Our experience,

ence, in this article, is less certain than their sentiment. Besides, we even abuse those sensations of appetite, which they possess in a more perfect degree: In brutes, these sensations are the means of health and preservation; but, in man, they become the causes of malady and destruction. Intemperance alone is more fatal to man than the united force of all the other evils incident to human nature.

By these considerations we are led to believe, that the feelings of animals are more determined and more exquisite than ours; for, though it were allowed that brutes frequently poison themselves, it must likewise be granted, that they never take poison but when concealed among other food, or when so pressed with hunger, that they eat whatever is presented to them; and many instances have occurred where animals have perished for want, rather than eat what was repugnant to their constitution.

The superior strength of sentiment in brutes may be still farther proved, by attending to their sense of smelling, which, in most animals, is so powerful, that they smell farther than they see: They not only scent actual objects at a distance, but they can trace them by their effluvia long after they are gone. Such a sense is an universal organ of perception; it is an eye that sees objects, not only where they are, but where they have been. In a word, it is a sense by which the animal is enabled to distinguish with certain-

ty what is agreeable to its nature, and by which it perceives what is fitted to gratify its appetite. Hence brute animals enjoy, in a superior degree, the senses relative to appetite; and, of course, have feelings more exquisite than those of men. They are likewise conscious of their actual existence; but retain no consciousness of their past existence. This latter proposition, as well as the first, merits consideration.

In man, consciousness of existence is composed of the perception of actual existence, as well as remembrance of past existence. Remembrance is a perception equally present with the first impression; it even sometimes affects us more strongly than actual sensations. As these two species of sensation are different, and as the mind has the faculty of comparing and forming ideas from them, the consciousness of our existence is more certain and extensive, in proportion to the number and frequency of past objects recalled by the memory, and to the frequent combining and comparing of them with each other, and with present objects. Each object is accompanied with a certain number of sensations, or different existences, relative to the different states in which it was originally perceived. This number of sensations, by the comparison made between them by the mind, becomes a succession or train of ideas. The idea of time, and indeed every other idea, originates from the comparison of our sensations. But this train of ideas, or of existences,

existences; often presents itself to us in an order or arrangement very different from that in which our sensations were received. It is the arrangement of our ideas that we perceive, and not the order of our sensations; and in this consist chiefly the differences of character and of genius; for two men, though similar in organization, and educated in the same manner, and though they received their sensations in the same order, might, notwithstanding, think very differently. As the temperament of their minds was not the same, and as each combined and compared similar sensations in a manner peculiar to himself, the general results of these comparisons, or the ideas, genius, and character acquired, would likewise be different.

Some minds are peculiarly active in comparing sensations and forming ideas. Such men are always the most ingenious, and, if not prevented by circumstances, make the most brilliant figure in life. There are others, whose minds being more obtuse, allow every sensation to escape, but such as make strong impressions: These men have less genius and vivacity than the former. Lastly, there are other men, and these constitute the multitude, who have so little activity of mind, and so great an aversion from thinking, that they never compare or combine sensations, at least, quickly. The sensations must be strong, and repeated a thousand times, before their minds can be roused to compare them,

them, or to form ideas. These men are exceedingly stupid, and only differ from the brutes by the small number of ideas which their minds have formed with so much labour.

The consciousness of our existence being thus composed not only of our actual sensations, but of the train of ideas which results from a comparison of our sensations, and of our past existences, it is evident, that the more ideas a man possesses, he is more certain of his existence; that his existence is proportioned to his genius; and that, by the power alone of reflection, we are conscious of our former existence, and that we will continue to exist, the idea of future being only the inverse comparison of the present with the past; for, in this view, the present is past, and the future present.

Now, the power of reflection being denied to brutes, it is obvious, that they cannot form ideas, and, consequently, that their consciousness of their existence must be less certain and less extensive than ours; for they have no idea of time, no knowledge of the past, or of the future. Their consciousness of existence is simple; it depends solely on the sensations which actually affect them, and consists of the internal feelings produced by these sensations.

We may, perhaps, acquire some notion of the consciousness of existence which animals possess, by reflecting on our own condition, when

strongly occupied with any object, or so violently agitated with passion as to preclude every reflex idea of ourselves. This condition is expressed by saying, A man is absent, or out of himself. We are out of ourselves when fully immersed in actual sensations, and especially when these sensations are violent, rapid, and leave the mind no leisure to reflect. In this state, we feel every degree of pleasure and pain; we even retain the consciousness of our existence, without any sensible participation of the mind. This condition, in which we have only momentary impressions of our existence, is the habitual state of animals; deprived of ideas, and furnished with sensations, they know not their existence, but they feel it.

To illustrate this difference more fully, let us compare the powers and actions of brute animals with those of man. Like us, they have senses, and receive impressions from external objects. They have also an internal sense, an organ which retains the vibrations excited by these impressions; and, consequently, sensations, which, like ours, may be renewed, and are more or less strong and durable. Still, however, they have neither imagination, understanding, nor memory; because they possess not the power of comparing their sensations, and because these three faculties of the mind depend upon this power.

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Have brute animals no memory? The contrary, I shall be told, is demonstrably evident: Do they not recollect, after long absence, the persons with whom they have lived, the places where they dwelt, the roads they frequented? Do they not remember the chastisements they had suffered, the caresses they had received, the lessons they had been taught? Every thing concurs in showing that, though deprived of imagination and reason, they possess an active, extensive, and, perhaps, more faithful memory than our own. But, however striking these appearances may be, and however strong the prejudices to which they have given rise, I imagine it is capable of demonstration that they are deceitful, and that the brutes have no knowledge of past events, no idea of time, and, of course, no memory.

In man, memory originates from the faculty of reflection; for our remembrance of past events supposes not only a continuation of the impressions made upon the internal material sense, or a renewal of former sensations, but likewise the comparison the mind makes between its sensations, or the ideas it forms. If memory consisted not in the renovation of past sensations, these sensations would be represented in our internal sense, without leaving any determined impressions; they would be exhibited without order or connection, like the ravings of persons mad or intoxicated, where objects are so deranged

ranged and confused, that no remembrance of them is retained; for we cannot remember things that have no relation to those which have preceded or followed them. No isolated sensation, however strong, can leave any traces on the mind. Now, it is the mind alone that ascertains the relations of objects, by the comparison it makes between them, and connects our sensations by a continued train of ideas. Memory, therefore, consists in a succession of ideas, and necessarily supposes the existence of the power by which they are produced.

But, to leave no room for doubt on this important point, let us examine that species of remembrance left by our sensations, when unaccompanied with ideas. Pain and pleasure are sensations of the purest and strongest kind; yet our recollection of these feelings is feeble and confused. We only remember that we felt pleasure or pain; but our remembrance is indistinct: We cannot figure either the species, the degree, or the duration of those feelings which affected us so powerfully; and still less are we able to have clear ideas of those which have been seldom repeated. A violent pain, for example, which is felt but once, continues only a few moments, and differs from all former pains, would necessarily be soon forgot. We might recollect that we felt a great pain; but, while we distinctly remembered the circumstances which attended it, and

and the time when it happened, we would have only a faint impression of the sensation itself.

Why is every thing that passed in our infancy entirely obliterated? Why do old men recollect what happened in their youthful years better than what occurred during their old age? Can there be a stronger proof that sensations alone are insufficient for the production of memory, and that it has no existence but in the train of ideas which the mind forms from its sensations? In infancy, our sensations are perhaps as lively and rapid as in middle age; yet they leave little or no traces behind them; because, at this period, the power of reflection, which alone forms ideas, is almost totally inactive; and, when it does act, its comparisons are superficial, and it is incapable of reducing objects to any regular arrangement. At the age of maturity, reason is fully unfolded, because the power of reflection is at its meridian. We then derive from our sensations all the fruit they can produce, and we form various orders of ideas and chains of thought, each of which, by being frequently revolved, makes an impression so deep and indelible, that, when old age arrives, the same ideas recur with more force than those derived from present sensations; because, at that period, our sensations are slow and feeble, and the mind itself participates the languor of the body. Infancy is totally occupied with the present time: In mature years, we enjoy equally the past, the present, and the future; and,

and, in old age, we have but slight feelings of the present, we turn our eyes to futurity, and only live in the past. Do not these differences depend entirely on the arrangement the mind has made of its sensations; and are they not more or less connected with the faculty we possess, at different ages, of forming, acquiring, and retaining ideas? Neither the prattling of the child, nor the garrulity of old age, have the tone of reasoning, because they are equally deficient in ideas; the first is yet unable to form them, and the last has lost the faculty.

An idiot, whose senses and bodily organs appear to be perfectly sound, possesses, in common with us, every kind of sensation, and, if he lived in society, and were obliged to act like other men, he would possess them in the very same order. But, as these sensations give rise to no ideas; as there is no correspondence between his mind and his body; and, as he has not the faculty of reflection; he is, of course, deprived of memory, and of all knowledge of himself. With regard to external powers, this man differs not from the brutes; for, though he has a soul, and possesses the principle of reason, as this principle remains inactive, and receives no intelligence from the bodily organs, it can have no influence on his actions, which, like those of the brute animals, are solely determined by his sensations, and by the consciousness of his actual existence and present wants. Thus, an idiot and a brute
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are beings whose operations are in every respect the same; because the latter has no soul, and the former makes no use of it: Both want the power of reflection, and, consequently, have neither understanding, imagination, nor memory; but they both possess sensations, feelings, and the faculty of moving.

If it shall still, however, be asked, Do not idiots and brutes often act as if they were determined by the knowledge of past objects? Do they not recollect the person with whom they have lived, the places where they dwelt, &c.? Do not these actions necessarily imply the exertions of memory? and, does not this prove that memory flows not from the power of reflection?

The reader ought to recollect, that I have already distinguished two species of memory, which, though they resemble each other in their effects, proceed from very different causes: The first is occasioned by the impressions of our ideas; and the second, which I would rather call reminiscence than memory, is only a renewal of our sensations, or of the vibrations that produced them. The first is an emanation of the mind, and, as already remarked, is more perfect in man than the second. But the latter is only a renovation of the vibrations of the internal material sense; and it alone is possessed by idiots and brute animals. Their former sensations are renewed by actual sensations; the principal and present

present recall the accessory and past images; they feel as they formerly felt, and consequently act as they formerly acted; they perceive the present and the past; but they have not the capacity of distinguishing, or comparing objects, and, of course, have no proper knowledge of them.

I am aware that dreams will be adduced as another proof of the memory of brutes. It is undeniable, that the objects which occupy animals when awake, are likewise presented to them during sleep. Dogs bark in their sleep; and, though this barking be feeble, it is easy to distinguish the sounds peculiar to the chase, to anger, to desire, to complaint, &c. It is, therefore, unquestionable, that dogs have a lively and active memory, and very different from what has been above described, since it acts independent of external causes.

To obviate this difficulty, we must examine the nature of dreams, and inquire whether they proceed from the mind, or depend solely on our internal material sense. If we can prove that they reside entirely in the latter, the objection will not only be removed, but a new demonstration will be furnished against the understanding and memory of brutes.

Idiots, whose minds are totally inactive, dream like other men: Dreams, therefore, are produced independent of the mind. Brute animals, though they have no mind, not only dream, but

I am tempted to think that all dreams are independent of mind. Let any man reflect upon his dreams, and endeavour to discover why the parts of them are so ill connected, and the events so ridiculous and absurd. The chief reason, I have always thought, proceeds from this circumstance, that dreams are entirely derived from sensations, and not from ideas. The idea of time, for example, never enters into dreams: Persons whom we never saw are represented; we even see those who have been long dead in the same form as when they were alive; but they are always connected with present objects and persons, or with those which are past. It is the same with the idea of place: In dreams we never see persons where they are; objects must be seen where they are not, or they cannot be perceived at all. If the mind acted, it would instantly reduce this chaos of sensations to order. But, instead of acting, the mind generally allows these illusory representations to succeed each other in the order they occur; and, though each object appears in lively colours, the succession is often confused, and always chimerical. If, however, the mind be half roused by the absurdity of the representations, or by the mere force of the sensations, a glimmering of light breaks in upon the darkness, and produces a real idea in the midst of chimeras; we then begin to dream, or rather to think, that the whole may be only a dream.

Though this action be only a feeble exertion of

the mind, it is neither a sensation nor a dream; it is a real thought or reflection; but, as it has not strength enough to dissipate the allusion, it mixes with, and becomes part of the dream, and allows the succession of images to proceed; so that, when we awake, we imagine we have dreamed what we in reality thought.

In dreams we see much, but seldom understand: Though we feel in the most lively manner, we never reason: Images and sensations succeed each other; but the mind never unites or compares them. We have, therefore, sensations, but no ideas; for ideas are the results of compared sensations. Hence dreams reside only in the internal material sense; they are produced without the intervention of the mind; and, therefore, constitute a part of that material or purely animal reminiscence which we have formerly mentioned. Memory, on the contrary, cannot exist without the idea of time, without the actual comparison of former ideas; and, since ideas enter not into dreams, it is obvious, that they can neither be a consequence, nor an effect, nor a proof of memory. But, though ideas should sometimes accompany dreams, though the somnambulists, who walk, speak sensibly, answer questions, &c. in their sleep, should be quoted to prove that ideas are not so entirely excluded from dreams as I pretend, it is sufficient for my purpose that dreams may be produced by the renewal of sensations alone, without the intervention of mind: For then brute animals
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can only have dreams of this species; and these dreams, instead of supposing the existence of memory, indicate, on the contrary, nothing more than a material reminiscence.

I am, however, far from believing that somnambulists are really occupied with ideas: The mind seems to take no part in their actions; for, though they go about and return, they act without reflection or knowledge of their situation. They are neither conscious of the dangers nor inconveniencies which accompany their expeditions. The animal faculties are alone employed, and even not the whole of them. A somnambulist, therefore, is in a more stupid state than that of an idiot; because he exerts only a part of his senses; but an idiot employs the whole, and enjoys extensively every species of feeling: And as to the people who speak during sleep, they never say any thing new. The answering some trivial questions, the repetition of some common phrases, prove not the action of the mind: All this may be performed independent of the thinking principle. Why may not a man asleep speak without thinking, since persons fully awake, especially when occupied with passion, utter many things without reflection?

With regard to the occasional cause of dreams, or the reason why former sensations are renewed, without being excited by present objects, it may be remarked, that we never dream during a profound sleep. Every thing is then extinguished;

guished; we sleep both externally and internally. But the internal sense sleeps last, and awakes first; because it is more active, and more susceptible of impressions than the external senses. We dream most, when our sleep is least perfect and profound. Former sensations, especially those which require no reflection, are renewed. The internal sense, occupied with actual sensations, on account of the inactivity of the external senses, exercises itself with its past sensations. The strongest always present themselves first; and the stronger they are, the supposed situations become more keenly interesting. It is for this reason that dreams are almost perpetually either dreadful or ravishing.

It is not even necessary that the external senses should be absolutely lulled, before the internal sense can exert its independent powers: The simple inaction of these senses is sufficient to produce this effect. The habit of going to repose at stated times often prevents us from sleeping easily. The body and its members are softly extended without motion; the eyes are involved in darkness; the tranquillity of the place, and the silence of the night, render the ear useless; the other senses are equally inactive; all is in a state of repose, but nothing as yet entirely lulled or asleep. In this condition, and when the mind is also unoccupied with ideas, the internal material sense alone exerts itself. This is the season of illusive images and fleeting shades. We are a-
wake,

wake, and yet we feel the effects of sleep. If we be in health and vigour, the succession of images and illusions is enchanting. But, when the body is disordered, or fatigued, the images are of a different nature: We are then tormented with hideous and threatening phantoms, which succeed each other with equal whimsicalness and rapidity. This scene of chimeras may be called a magic lanthorn which fills the brain with illusions, when void of all other sensations: The objects of this scene are more lively, numerous, and disagreeable, in proportion to the weakness of the body and delicacy of the nerves; for, the vibrations occasioned by real sensations being, in a state of weakness or disease, much stronger and more disagreeable than in a healthy state, the representations of these sensations, produced by a renewal of the same vibrations, must likewise be more lively and painful.

In fine, we remember dreams for the same reason that we remember former sensations: The only difference between us and the brutes is, that we can distinguish dreams from ideas or real sensations; and this capacity of distinguishing is a result of comparison, an operation of memory, which includes the idea of time. But the brutes, who are deprived of memory and of the faculty of comparing past and present time, cannot distinguish their dreams from their actual sensations.

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In the article concerning the nature of man, I imagine I have proved, in a satisfactory manner, that animals possess not the power of reflection. Now, the understanding, which is a result of this power, may be distinguished by two different operations: The first is the faculty of comparing sensations, and forming ideas from them; and the second is the power of comparing the ideas themselves, and forming a chain of reasoning. By the first operation, we acquire particular ideas, or the knowledge of sensible objects: By the second, we form general ideas, which are necessary for the acquisition of abstract truths. The brute animals possess neither of these faculties, because they have no understanding; and the understanding of the bulk of mankind seems to be limited to the first of the above operations.

If all men were equally capable of comparing and generalizing ideas, they would equally exhibit their ingenuity by new productions, which would be always different from those of others, and often more perfect; all men would be endowed with inventive powers, or, at least, with the capacity of improving and perfecting. But this is by no means the case: Reduced to a servile imitation, most men execute only what they have seen performed by others; they think only from memory, and in the same order as others have thought; their understanding is limited entirely

tirely to form and imitation, and their power of reflecting is too feeble for invention.

Imagination is another faculty of the mind: If, by imagination, we understand the power of comparing images with ideas, of illuminating our thoughts, of aggrandizing our sensations, of painting our sentiments, in a word, of perceiving with rapidity all the qualities and relations of objects, this power is the most brilliant and most active faculty of the mind, and the brutes are still more devoid of it, than either of understanding or memory. But there is another species of imagination, which depends solely on corporeal organs, and is common to us with the brutes, namely, that tumultuary emotion excited by objects analogous or opposite to our appetites, that lively and deep impression of the images of objects, which perpetually and involuntarily recurs, and forces us to act, like the brutes, without deliberation or reflection. By this representation of objects, which is more active than their presence, every thing is exaggerated, and painted in false colours. This species of imagination is the grand enemy of the human mind: It is the source of illusion, the mother of those passions which, in spite of the efforts of reason, rule over us, and render us the unhappy theatre of a perpetual combat, in which we are almost constantly vanquished.

H O M O

HOMO DUPLEX.

The internal man is *double*. He is composed of two principles, different in their nature, and opposite in their action. The mind, or principle of all knowledge, wages perpetual war with the other principle, which is purely material. The first is a bright luminary, attended with calmness and serenity, the salutary source of science, of reason, and of wisdom. The other is a false light, which shines only in tempest and obscurity, an impetuous torrent, which involves in its train nothing but passion and error.

The animal principle is first unfolded. As it is purely material, and consists in the duration of vibrations, and the renewal of impressions formed in the internal material sense, by objects analogous or opposite to our appetites, it begins to act, and to guide us, as soon as the body is capable of feeling pain or pleasure. The spiritual principle appears much later, and is only unfolded and brought to maturity by means of education: It is by the communication of others thoughts alone that the child becomes a thinking and rational creature. Without this communication, it would be stupid or fantastical, according to the natural inactivity or activity of its internal material sense.

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Let us view a child when left at full liberty, and removed from the observation of his guide. We may judge of what passes within him from his external actions. He neither thinks nor reflects. He follows indifferently every path to pleasure. He obeys all the impressions of external objects. He acts without reason. Like the young animals, he amuses himself by running and bodily exercise. He goes and returns, without design or preconceived project. His actions are desultory, and without order or connection. But, when called upon by his parents, or those who have learned him to think, he instantly composes himself, gives a direction to his actions, and shows that he has retained the thoughts which had been communicated to him. The material principle has absolute sway during infancy, and would continue to reign alone through life, if the spiritual principle were not unfolded and put in motion by education.

It is easy, by reflection, to perceive the existence of these two principles. There are moments, and even hours and days, in which we can distinguish with certainty both their existence, and the contrariety of their action. I refer to those times of indolence, of fatigue, or disgust, when we are unable to form any determination, when our actions and desires are diametrical opposite; to that condition or disease called *vapours*, with which the sedentary and idle are so often affected. If we examine ourselves

when in this state, we will seem to be divided into two distinct beings, the first of which, or the rational faculty, blames what is done by the second, but has seldom force enough to overcome it; the latter, on the contrary, being composed of all the illusions of sense and imagination, commands, and often overpowers the former, and forces us to act contrary to our judgment, or makes us remain idle, though we have a desire of acting.

When the rational faculty reigns, a man feels a tranquil possession of himself and his affairs; but he perceives, at the same time, that this is only acquirable by a kind of involuntary abstraction from the presence of the other principle. But, when the irrational principle assumes the dominion, we resign ourselves with ardour to dissipation, to appetite, and to passion, and hardly reflect upon the very objects which occupy us so entirely. In both these states, we are happy: In the first, we command with satisfaction; and, in the second, we have still greater pleasure in obeying. As only one of these principles is then in action, and is not opposed by the other, we are sensible of no internal conflict; our existence appears to be simple, because we feel but one impulse: It is in this unity of action that our happiness consists; for, whenever reason accuses our passions, or when the violence of passion makes us hate the admonitions of reason, we then cease to be happy; we lose the unity of our
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our existence, in which alone tranquillity consists; an internal conflict commences; the two persons oppose each other; and the two principles manifest themselves by producing doubts, inquietude, and remorse.

We may hence conclude, that the most miserable of all states takes place, when these two sovereign powers of human nature exert equally their greatest efforts, and produce an equilibrium. This is that ultimate point of disgust, which makes a man abhor himself, and leaves no other desire but that of ceasing to exist, no other power but that of arming with fury against himself.

What a dreadful condition! I have painted its darkest shade. But how many black clouds must precede? All the situations adjacent to this state of equilibrium, must be replete with melancholy, irresolution, and misery. Even the body itself falls a victim to the agitations produced by these internal conflicts.

The happiness of man consists in the unity of his internal frame: During infancy, he is happy, because the material principle reigns alone, and is in perpetual action. The constraints, remonstrances, and even the chastisements of parents, affect not the basis of happiness in children. No sooner do they obtain their liberty, than they resume all the spring and gaiety which they receive from the novelty and vivacity of their sensations. If a child were entirely left to himself,
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his happiness would be complete ; but it would cease, and be succeeded with a long train of misery. We are therefore obliged to lay him under certain restraints, which frequently make him uneasy ; but these transitory pains are the germs of all his future good.

In youth, when the mental principle begins to act, and might even serve for our guide, a new material sense springs up, and assumes such an absolute dominion over all our faculties, that the soul seems to yield itself a willing victim to the impetuous passions excited by this sense. The material principle now gains a more complete command than it formerly possessed ; for it not only subdues reason, but perverts it, and employs it as an instrument of gratification : We neither think nor act, but with a view to approve and to satisfy this passion. As long as this intoxication continues, we are happy : External opposition and difficulties seem to corroborate the unity of this internal principle ; they fortify the passion ; they fill the intervals of languor ; they rekindle the flame, and turn all our views to the same object, and all our powers towards the accomplishment of the same end.

But this happy scene passes away like a dream ; the charm vanishes ; and disgust and a frightful void succeed the plenitude of agreeable feelings with which we had been occupied. The mind, when roused from this lethargy, recognises itself with difficulty. It has lost by slavery the habit
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of commanding, together with its strength. It even loves servitude, and goes in quest of a new tyrant, a fresh object of passion, which, in its turn, soon disappears, and is succeeded by another, whose duration is still shorter. Thus excess and disgust continue to multiply; pleasure flies from our embrace; the organs are debilitated, and the material sense, in place of governing, has not even the power to obey. After a youth spent in this manner, nothing remains but an enervated body, a feeble and effeminate mind, and a total incapacity of employing either.

It has been remarked, that, in the middle period of life, men are most subject to those languors of mind, that internal malady which is distinguished by the name of *vapours*. At this age, we still search after the pleasures of youth. This is the effect of habit, and not of any natural propensity. In proportion as we advance in years, instead of pleasure, we more frequently feel the incapacity of enjoyment. Our desires are so often contradicted by our weakness, that we condemn both our actions and the passions which we wish in vain to gratify.

It is, besides, at this age, that cares and solicitude arise: We then assume a certain state, or, in other words, either from chance or choice, we enter upon a particular course of life, which it is always shameful to abandon, and often dangerous to pursue. We proceed, therefore, between two rocks equally formidable, contempt and aversion.

version. The efforts we make to avoid them weaken our powers, and throw a damp upon our spirits: For, after long experience of the injustice of men, we acquire the habit of regarding every individual as necessarily vicious; and, after we are accustomed to prefer our own repose to the opinions of the world, and after the heart, rendered callous by the frequent wounds it has received, has lost its sensibility, we easily arrive at that state of indifference, that indolent tranquillity, of which we would formerly have been ashamed. Ambition, the most powerful motive of elevated minds, which is regarded at a distance as the noblest and most desirable of all objects, and which stimulates us to the performance of great and useful actions, has no attractions to those who have approached it, and proves a vain and deceitful phantom to those who fall behind in the pursuit. Indolence takes place of ambition, and seems to offer to all men an easier acquisition of more solid good. But it is preceded by disgust, and followed by languor, that dreadful tyrant of thinking minds, against which wisdom has less influence than folly.

It is hence apparent, that the difficulty of reconciling man to himself originates from his being composed of two opposite principles; and that this is the source of his inconstancy, irresolution, and languor.

Brute animals, on the contrary, whose nature is

is simple and purely material, feel no internal conflicts, no remorse, no hopes, no fears.

If we were deprived of understanding, of memory, of genius, and of every faculty of the soul, nothing would remain but the material part, which constitutes us animals. We would still have wants, sensations, pleasure, pain, and even passions; for what is passion but a strong sensation, which may every moment be renewed? Now, our sensations may be renewed in an internal material sense; we would, therefore, possess all the passions, at least all those which the mind, or principle of intelligence, can neither produce nor foment.

But the great difficulty is to distinguish clearly the passions peculiar to man from those which are common to him and the brutes. Is it certain, or even probable, that the animals have passions? Is it not, on the contrary, agreed, that every passion is a strong emotion of the mind? Ought we not, therefore, to search somewhere else, than in the spiritual principle, for the seeds of pride, of envy, of ambition, of avarice, and of all the other passions which govern us?

To me it appears, that every thing which governs the mind is extraneous to it; that the principle of intelligence is not the principle of sentiment; that the seeds of the passions exist in our appetites; that all illusions proceed from the senses, and reside in our internal material sense; that, at first, the mind has no participation in these

these illusions, but by its silence; and that, when the mind does give any countenance to them, it is subdued, and, when it assents, it is totally perverted.

Let us then distinguish man's physical from his moral passions: The one is the cause; the other the effect. The first emotion originates in the internal material sense: The mind may receive, but it cannot produce this emotion. Let us likewise distinguish instantaneous emotions from those that are durable, and we shall, at once, perceive, that fear, horror, anger, love, or rather the desire of enjoyment, are sensations, which, though durable, depend solely on the impressions of objects upon our senses, combined with the subsisting impressions of our former sensations; and, consequently, that those passions must be common to us and the other animals: I say, that the actual impressions of objects are combined with the subsisting impressions of our former sensations; for nothing is horrible or alluring, either to man or the brutes, when seen for the first time. This is fully proven by experience: A young animal will run into the flames the first time a fire is presented to it. Animals acquire experience only by reiterated acts, the impressions of which remain in their internal sense; and, though their experience be not natural, it is not less sure, and even renders the animal more circumspect; for a great noise, a violent motion, an extraordinary figure, suddenly,

denly, and for the first time, seen or presented, produce in the animal a shock, the effect of which resembles the first expressions of fear: But this feeling is instantaneous; and, as it cannot be combined with any former sensation, it can only excite a momentary vibration, and not a durable emotion, which the passion of fear necessarily implies.

A young inhabitant of the forest, when suddenly struck with the sound of a hunter's horn, or with the report of a gun, starts, bounds, and flies off, solely from the violence of the shock which he felt. But, if this noise ceases, and has been attended with no injury, the animal recognises the ordinary silence of nature; he composes himself, stops, and returns to his peaceable retreat. But age and experience soon render him timid and circumspect. If he feels himself wounded or pursued, after hearing a particular sound, the painful sensation is preserved in his internal sense; and, whenever he again hears the same noise, the painful sensation is renewed, and, combining with the actual impression, produces a durable passion, a real fear; the animal flies with all his speed, and often abandons for ever his former abode.

Fear, then, is a passion of which brute animals are susceptible, though they feel not our rational or foreseen apprehensions. The same remarks apply to horror, anger, and love; though brutes have none of our reflex aversions, our

endurable resentments, or our constant friendships. Brute animals possess all those primary passions, which suppose no intelligence, no ideas, and are founded only on the experience of sentiment, or repeated feelings of pleasure and pain, and a renewal of former sensations of the same kind. Anger, or natural courage, is remarkable in those animals who have exerted their strength, and found it superior to that of others. Fear is the offspring of weakness; but love is common to all animals. Love is an innate desire, the soul of nature, the inexhaustible fountain of existence, the germ of perpetuity infused by the Almighty into every being that breathes the breath of life. It softens the most ferocious and obdurate hearts, and penetrates them with a genial warmth. It is the source of all good; by its attractions it unites the most savage and brutal tempers, and gives birth to every pleasure. Love! Thou divine flame! Why dost thou constitute the happiness of every other being, and bring misery to man alone? Because this passion is only a physical good. Notwithstanding all the pretences of lovers, morality is no ingredient in the composition of love. Wherein does the morality of love consist? In vanity; the vanity arising from the pleasure of conquest, an error which proceeds from our attempts to exalt the importance of love beyond its natural limits; the vanity of exclusive possession, which is always accompanied with jealousy, a passion so low, that we uniformly

niformly wish to conceal it; the vanity proceeding from the mode of enjoyment, which only multiplies efforts, without increasing our pleasures. There is even a vanity in relinquishing the object of our attachment, if we first wish to break it off. But, if we are slighted, the humiliation is dreadful, and turns into despair, after discovering that we have been long duped and deceived.

Brute animals suffer none of these miseries. They search not after pleasure where it is not to be found. Guided by sentiment alone, they are never deceived in their choice. Their desires are always proportioned to the power of gratification. They relish all their enjoyments, and attempt not to anticipate or diversify them. But man, by endeavouring to invent pleasures, destroys those which correspond to his nature; by attempting to force sentiment, he abuses his being, and creates a void in his heart which nothing can afterwards fill up.

Thus, every thing that is good in love belongs to the brutes as well as to man; and, as if this passion could never be pure, the animals even seem to feel a small portion of jealousy. Jealousy, in the human species, always implies some distrust of ourselves, a tacit acknowledgment of our own weakness. The animals, on the contrary, seem to be jealous in proportion to their force, ardour, and habits of pleasure; because our jealousy proceeds from ideas, and theirs from sentiment.

sentiment. They have enjoyed, and they desire to enjoy more. They feel their strength, and they beat off all that endeavour to occupy their place. Their jealousy is not the effect of reflection. They turn it not against the object of their love. They are only jealous of their pleasures.

But, are animals limited solely to those passions we have described? Are fear, anger, horror, love, and jealousy, the only permanent affections they are capable of feeling? To me it appears, that, independent of these passions, of which natural sentiment, or rather the experience of sentiment, renders animals susceptible, they possess other passions, which are communicated to them by education, example, habit, and imitation. They have a species of friendship, of pride, and of ambition. And though, from what has been said, it is apparent that the operations they perform are not the effects of thought or reflection; yet, as the habits we have mentioned seem to suppose some degree of intelligence, and to form the shade between man and the brute creation, this subject merits a careful examination.

Can any thing exceed the attachment of a dog to his master? Some of them have been known to die on the tomb in which he had been laid. But, (not to quote prodigies or heroes), with what fidelity does the dog attend, follow, and protect his master! With what anxiety does he seek his caresses! With what docility

cility and alacrity does he obey him ! With what patience does he suffer his ill humour, and even his chastisements, though often unjust ! With what gentleness and humility does he endeavour to regain his favour ! In a word, what agitation and chagrin does the dog discover when his master is absent ; and what excess of joy on his return ! In all these expressions, is it possible to mistake the genuine characters of friendship ? Are these characters equally strong and energetic, even in the human species ?

This friendship, however, is the same with that of a lady for her goldfinch, of a child for its toy, or a dog for its master. Both attachments are equally blind and void of reflection ; That of animals is only more natural, because it arises from their wants ; while that of the other is nothing but an insipid amusement, in which the mind has no share. These puerile attachments are kept alive by habit, and acquire all their strength from a vacancy of brain. A taste for whims, the worship of idols, and, in a word, an attachment to inanimated objects, indicate the highest degree of stupidity ; and yet there are many makers and worshippers of idols ; and many are fond of the soil which they have tilled.

All attachments, therefore, are acquired without the intervention of the mind ; for they uniformly arise when we think least, and they acquire force, and become habitual, by want of reflection. If an object pleases our senses, we instantly

instantly love it; and, if this object continues for some time to occupy our attention, we convert it into an idol.

But friendship necessarily implies the power of reflection. It is of all attachments the most worthy of man, and the only one which degrades not his nature. Friendship is the offspring of reason. The impressions of sense have no share in its production. It is the mind of our friend that we love; and to love a mind, implies that we have one, and that we have employed it in the investigation of knowledge, and in distinguishing the qualities of different minds. Friendship, therefore, supposes, not only the existence of an intelligent principle, but the actual exertions of this principle in reflecting and reasoning.

Thus friendship belongs only to man; and, though the brutes may be allowed to have attachments, sentiment alone is sufficient to attach them to those whom they often see, and by whom they are fed and taken care of. It is still more sufficient to attach them to objects with which they are obliged to be much connected. The attachment of mothers to their young proceeds from their being long occupied in carrying them in the womb, and in producing and suckling them. In some species of birds, the fathers seem to have an attachment for their offspring, and to provide for the mothers during incubation: This attachment originates from their being employed in building the
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the nest, and from the pleasure they receive from the females, which continue in season long after impregnation. But, in the other animals, whose season of love is short, whenever it is past, the males have no attachment to the females. Where there is no nest, no common operation to be performed, the fathers, like those of Sparta, have no regard to their posterity.

The pride and ambition of animals are effects of their natural courage, or of the sentiments arising from their strength, agility, &c. Large animals seem to despise the audacious insults of the smaller ones. Their courage and ardour are even capable of being improved by education and example; for they are susceptible of every thing, except reason. In general, brute animals can learn to repeat the same action a thousand times, to perform in succession what they only did by intervals, to continue an action a long time, which they were accustomed to finish in an instant, to do voluntarily what at first was the effect of force, to perform habitually what they once executed by chance, and to do, of their own accord, what they see performed by others. Of all the results of the animal machine, that of imitation is the most admirable. It is the most delicate, as well as the most extensive principle of action, and makes the nearest approach to thought: And though, in animals, the cause of it be purely material, its effects have always been astonishing. Men never admired the

the apes, till they saw them imitate human actions. It is not, indeed, an easy matter to distinguish some copies from the originals. There are, besides, so few who can clearly perceive the difference between genuine and counterfeit actions, that, to the bulk of mankind, the apes must always excite surprise and humiliation.

The apes, however, are more remarkable for talents than genius. Though they have the art of imitating human actions, they are still brutes, all of which, in various degrees, possess the talent of imitation. This talent, in most animals, is entirely limited to the actions of their own species. But the ape, although he belongs not to the human species, is capable of imitating some of our actions. This power, however, is entirely the effect of his organization. He imitates the actions of men, because his structure has a gross resemblance to the human figure. What originates solely from organization and structure, is thus ignorantly ascribed, by the vulgar, to intelligence and genius.

By the relations of motion, a dog learns the habits of his master; by the relations of figure, an ape mimics human gestures; and, by the relations of organization, a goldfinch repeats musical airs, and a parrot imitates speech, which forms the greatest external difference between one man and another, and between man and the other animals; for, by means of language, one man discovers a superiority of knowledge and
genius

genius, while others express by it nothing but confused or borrowed ideas; and, in an idiot, or in a parrot, it serves only to mark the last degree of stupidity, the incapacity, in either, to produce thought or reflection, though both be endowed with proper organs for expressing what passes within them.

It is still easier to prove that imitation is a result of mere mechanism. The most perfect imitation depends on the vivacity with which the internal material sense receives the impressions of objects, and the facility of expressing them by the aptness of external organs. Men whose senses are most delicate and easily affected, and whose members are most agile and flexible, make the best actors, the best mimics, the best monkeys. Children, insensibly, and without reflection, imitate the actions, the gestures, and the manners of those with whom they live: They are extremely alert in repeating and counterfeiting. Most young people, though they see only with the eyes of the body, are very dexterous in perceiving ridiculous figures. They are struck with every strange form or new representation. The impression is so strong that they relate it with enthusiasm, and copy it with ease and with gracefulness. Children, therefore, possess, in a superior degree, the talent of imitation, which supposes more perfect organs, and a more happy disposition of members, to which nothing is so repugnant as a strong dose of good sense.

Thus, among men, those who reflect least, have generally the strongest imitative talents. It is not, therefore, surprising, that this talent should appear in those animals who have no reflection. They ought even to possess it in the highest degree of perfection, because they have nothing to oppose its operation, no principle to excite a desire of differing from each other. Among men, all the diversity of character, and variety of action, proceed entirely from the mind. But brute animals, who have no mind, and consequently are destitute of that principle which can alone give rise to variety of character, or of personal accomplishments, must, when they resemble each other in organization, or are of the same species, do the same things in the same manner, and imitate one another more perfectly than one man can imitate the actions of another man. Of course, the talent of imitation possessed by the brute animals, so far from implying thought or reflection, proves that they are absolutely deprived of both.

It is, for the same reason, that the education of animals, though short, is always successful. They soon acquire, by imitation, all the knowledge of their parents. They not only derive experience from their own feelings, but, by means of imitation, they learn the experience acquired by others. Young animals model themselves entirely upon the old: They see the latter approach or fly, when they perceive particular objects,

objects, hear certain sounds, or smell certain odours. At first, they approach or fly without any other determining principle but that of imitation; and afterwards they approach or fly of their own accord, because they have then acquired the habit of flying or approaching, whenever they feel the same sensations.

Having thus compared man with the brutes, when taken individually, I shall now compare man in society with the gregarious tribes, and endeavour to investigate the cause of that species of industry which is so remarkable in some animals, even of the lowest and most numerous orders. What marvellous feats are not daily ascribed to certain insects? The talents and wisdom of the bee are admired with envy: They are said to possess an art peculiar to themselves, the art of perfect government. A bee-hive, say the eulogists of this insect, is a republic where every individual labours for the community, where every thing is distributed and arranged with a foresight, an equity, and a prudence, that is truly astonishing: The policy of Athens itself was not more perfect, or better conducted: The more we examine these insects, they exhibit fresh objects of admiration; an unalterable and uniform system of government, a profound respect for the sovereign, an anxious attention to his welfare and inclinations, an ardent love to their country, an incredible assiduity in labouring for the public good, the greatest disinterestedness,
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joined to the strictest oeconomy, the finest geometry, combined with the most elegant architecture, &c. But, were I to run over the annals of this republic, and to retail all the incidents in the oeconomy of these insects, which have excited the admiration of their historians, I should never come to an end.

Independent of that attachment which men acquire for their favourite subjects, the more they observe, and the less they reason, their admiration is proportionally augmented. Can any thing be more gratuitous than this blind admiration of bees, than the pure republican principles ascribed to them, than that singular instinct which rivals the most sublime geometry, which solves, without hesitation, the difficult problem of *building, in the most solid manner, in the least possible space, and with the greatest possible oeconomy?* These eulogies are not only excessive, but ridiculous: A bee ought to hold no higher rank in the estimation of a naturalist, than it actually holds in nature. This wonderful republic, therefore, must always appear, in the eye of reason, to be only an assemblage of small animals, which have no other relation to man, but that of furnishing him with wax and honey.

I here blame not curiosity, but absurd exclamation, and false reasoning! To examine the operations of bees, to observe the progress of their labours, to describe their generation, their metamorphoses, &c. these are objects worthy the
attention

attention of philosophers. But it is the morality, and even the theology ascribed to insects, that I cannot bear with patience: It is the marvelous feats first invented, and then extolled by naturalists, which I wish to examine: It is the intelligence, the foresight, and even the knowledge of futurity, which have, with so much complaisance, been falsely lavished upon them, that I must endeavour to reduce to their just value.

The genius of solitary bees, it is allowed on all hands, is vastly inferior to that of the gregarious species; and the talents of those which associate in small troops, are less conspicuous than of those that assemble in numerous bodies. Is not this alone sufficient to convince us, that the seeming genius of bees, is nothing but a result of pure mechanism, a combination of movements proportioned to numbers, an effect which appears to be complicated, only because it depends on millions of individuals? Has not every congruity, and even disorder itself, the appearance of harmony, when we are ignorant of the cause? From apparent order to actual intelligence, there is but one step; for men are always more disposed to admire, than to reason.

It must, therefore, be admitted, that bees, taken separately, have less genius than the dog, the monkey, and most other animals: It will likewise be admitted, that they have less docility, less attachment, and less sentiment; and that they possess fewer qualities relative to those of the

the human species. Hence we ought to acknowledge, that their apparent intelligence proceeds solely from the multitude united. This union, however, presupposes not intellectual powers; for they unite not from moral views: They find themselves assembled together without their consent. This society, therefore, is a physical assemblage ordained by Nature, and has no dependence on knowledge or reasoning. The mother bee produces at one time, and in the same place, ten thousand individuals, which, though they were much more stupid than I have supposed them, would be obliged, solely for the preservation of their existence, to arrange themselves into some order. As they all act against each other with equal forces, supposing their first movements to produce pain, they would soon learn to diminish this pain, or, in other words, to afford mutual assistance: They, of course, would exhibit an air of intelligence, and of concurring in the accomplishment of the same end. A superficial observer would instantly ascribe to them views and talents which they by no means possess: He would explain every action: Every operation would have its particular motive, and prodigies of reason would arise without number; for ten thousand individuals produced at one time, and obliged to live together, must all act in the very same manner; and, if endowed with feeling, they must acquire the same habits, assume that arrangement which is least painful

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or most easy to themselves, labour in their hive, return after leaving it, &c. Hence the origin of the many wonderful talents ascribed to bees, such as their architecture, their geometry, their order, their foresight, their patriotism, and, in a word, their republic, the whole of which, as I have proved, has no existence but in the imagination of the observer.

Is not Nature herself sufficiently astonishing, without ascribing to her miracles of our own creation? Are not the works of the Almighty sufficient to demonstrate his power? and do we imagine that we can enhance it by our weakness? If possible, this is the very way to degrade his perfections. Who gives the grandest idea of the supreme Being; he who sees him create the universe, arrange every existence, and found nature upon invariable and perpetual laws; or he who inquires after him, and discovers him conducting and superintending a republic of bees, and deeply engaged about the manner of folding the wings of a beetle?

Some animals unite into societies, which seem to depend on the choice of those that compose them, and, consequently, make a nearer approach to intelligence and design than that of the bees, which has no other principle than physical necessity. The elephants, the beavers, the monkeys, and several other species of animals, assemble in troops, for defending each other, and for the purpose of carrying on some common operations. If these societies

societies were less disturbed, and, if they could be observed with equal ease as that of the bees, we should doubtless discover wonders of a very different nature, which, notwithstanding, would be only effects of physical laws. When a multitude of animals of the same species are assembled in one place, a particular arrangement, a certain order, and common habits, must be the necessary results *. Now, every common habit, so far from having intelligence for its cause, implies nothing more than a blind imitation.

Society, among men, depends less upon physical than moral relations. His weakness, his wants, his ignorance, and his curiosity, soon taught him the necessity of associating: He soon found that solitude was a state of war and of danger; and he sought for safety, peace, and society. He augmented his own power and his knowledge, by uniting them with those of his fellow-creatures. This union was the best use he ever made of his rational faculties. Man commands the universe solely because he has learned to govern himself, and to submit to the laws of society.

Every thing has concurred to render man a social animal: Though large and polished societies certainly depend upon custom, and sometimes on the abuse of reason, they were unquestionably preceded by smaller associations, which had no basis but that of nature. A family is a
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* See the history of the deer, rabbit, &c.

natural society, which has deeper and more permanent foundations, because it is accompanied with more wants, and more causes of attachment. Man differs from the other animals: When he comes into the world, he hardly exists. Naked, feeble, and incapable of action, his life depends on the aid of others. The weaknesses of infancy continue long. The necessity of support is converted into a habit, which, of itself, is capable of producing a mutual attachment between the child and its parents. But, as the child advances, he gradually acquires more force, and has less need of assistance. The affection of the parents, on the contrary, continues, while that of the child grows daily less. Thus love descends more than it ascends. The attachment of the parent becomes excessive, blind, and invincible; and that of the child remains cold and inactive, till the seeds of gratitude are unfolded by reason.

Thus human society, even when confined to a single family, implies the existence of the rational faculty; that of gregarious animals, who seem to unite from choice and convenience, implies experience and sentiment; and that of insects, which, like the bees, are associated without design or motive, implies nothing at all. Whatever may be the effects of this latter association, it is clear, that they have neither been foreseen nor conceived by the creatures which produced them, and that they result solely from the

universal laws of mechanism established by the Almighty. Suppose ten thousand automaton assembled in the same place, all endowed with the same force, and determined, by a perfect resemblance in their external and internal structure, and by a uniformity in their movements, to perform the same operation, a regular work would be the necessary result. They would exhibit the relations of regularity, of resemblance, and of position; because these depend upon the relations of motion, which we have supposed to be equal and uniform. The relations of juxtaposition, of extension, and of figure, would also appear; because we have supposed a given and circumscribed place: And, if we bestow on these automaton the smallest degree of sensation, just as much as is necessary to make them feel their existence, to have a tendency to self-preservation, to avoid what is hurtful, to desire what is agreeable, &c. their operations will be not only regular, proportioned, similar, and equal, but they will have the air of the highest symmetry, solidity, convenience, &c.; because, in the process of their labours, each of the ten thousand individuals has assumed that arrangement which was most commodious to itself, and has, at the same time, been obliged to act, and to arrange itself in the manner least incommodious to the rest.

Shall I enforce this argument still farther? The hexagonal cells of the bee, which have been the

the subject of so much admiration, furnish an additional proof of the stupidity of these insects: This figure, though extremely regular, is nothing but a mechanical result, which is often exhibited in some of the most rude productions of nature. Crystals, and several other stones, as well as particular salts, &c. constantly assume this figure. The small scales in the skin of the rouffette, or great bat, are hexagonal, because each scale, when growing, obstructs the progress of its neighbour, and tends to occupy as much space as possible. We likewise find these same hexagons in the second stomach of ruminating animals, in certain seeds, capsules, and flowers, &c. If we fill a vessel with cylindrical grain, and, after filling up the interstices with water, shut it close up, and boil the water, all these cylinders will become hexagonal columns. The reason is obvious, and purely mechanical. Each cylindrical grain tends, by its swelling, to occupy as much space as possible; and therefore, by reciprocal compression, they necessarily assume an hexagonal figure. In the same manner, each bee endeavours to occupy as much space as possible, in the limited dimensions of the hive; and, therefore, as the bodies of the bees are cylindrical, they must necessarily make their cells hexagonal, from the reciprocal obstruction they give to each other.

The genius of bees has been estimated according to the regularity of their works. Bees are said

said to be more ingenious than wasps, hornets, &c.; for, though the latter are acquainted with architecture, their fabrics are more rude and irregular. But it was not considered by the abettors of this opinion, that the greater or less regularity depends solely on the number and figure, and not on the intelligence of these creatures. In proportion to the greatness of the number, there are more equal and opposite forces in action, and, of course, more mechanical restraint, and more regularity and apparent perfection in their works.

Those animals, therefore, who most resemble man in figure and organization, notwithstanding the eulogists of insects, will still remain superior to all others, in their internal qualities: And, though these qualities be infinitely different from those of man, though they are only, as has been proved, the results of experience and feeling; yet they greatly exceed the qualities of insects. As every operation of nature is conducted by shades, or slight gradations, a scale may be formed for ascertaining the intrinsic qualities of every animal, by taking, for the first point, the material part of man, and by placing the animals successively at different distances, in proportion as they approach or recede from that point, either in external form, or internal organization. Agreeable to this scale, the monkey, the dog, the elephant, and other quadrupeds, will hold the first rank; the cetaceous animals, who,

who, like the quadrupeds, consist of flesh and blood, and are viviparous, will hold the second; the birds, the third, because they differ more from man than the quadrupeds or cetaceous animals; and, were it not for oysters and polyps, which seem to be the farthest removed from man, the insects would be thrown into the lowest rank of animated beings.

But, if the animals be deprived of understanding, of genius, of memory, and of all intelligence; if their faculties depend on their senses, and be limited entirely to the exercise of experience and of feeling, how can we account for that species of foresight which some of them seem to possess? Could feelings alone determine them to amass provisions in summer to nourish them during the rigours of winter? Does not this imply a comparison of time, a rational anxiety concerning their future comfort and subsistence? Why do birds build nests, if they know not that they will be useful for depositing their eggs and rearing their young? It is unnecessary to multiply facts of the same nature.

Before solving these questions, or reasoning concerning the above and similar facts, it is necessary to ascertain their reality: Instead of being retailed by lovers of the marvellous, if they had been examined by men of sense, and collected by philosophers, I am persuaded, that all these pretended miracles would have soon disappeared, and that, by cool and dispassionate reflection, the cause

cause of each particular fact might have been discovered. But, let us admit the truth of all these facts; let us allow to the animals foresight, and even a knowledge of the future, can this be ascribed to their intellectual powers? If this were really the case, their intelligence would be greatly superior to ours: For our foresight is entirely conjectural; our notions concerning futurity are always doubtful, and founded on probabilities. Hence brute animals, who see the future with certainty, since they determine before hand, and are never deceived, would be endowed with a principle of knowledge superior to the human mind. I ask, whether this conclusion be not equally repugnant to religion and to reason? It is impossible, therefore, that the brutes have a certain knowledge of the future from an intellectual principle similar to ours. Why, then, ascribe to them, upon such slight grounds, a quality so sublime? Why unnecessarily degrade the human species? Is it not less unreasonable to refer the cause to mechanical laws, established, like the other laws of nature, by the will of the Creator? The certainty with which animals are supposed to act, and the stability and uniformity of their determinations, sufficiently evince them to be the effects of pure mechanism. To doubt, to deliberate, to compare, are the essential characters of reason. But movements and actions which are always decisive, and always certain, indicate,

indicate, at the same time, both mechanism and stupidity.

But, as the laws of nature are only general effects, and, as the facts in question are limited and particular, it would be less philosophic, and more unworthy of the ideas we ought to entertain of the Creator, to embarrass his will thus gratuitously with a vast number of petty statutes, of which one must be enacted for bees, another for owls, a third for field-mice, &c. Should we not, on the contrary, exert all our efforts to reduce these particular effects to more general ones? And if that be impossible, let us record them, and wait patiently till new facts and new analogies enable us to investigate their causes.

Let us, however, examine if these facts be so inexplicable and so marvellous, or even if they be properly authenticated. The foresight ascribed to ants is now discovered to be a vulgar error. They remain in a torpid state during winter. Their provisions, therefore, are only a superfluous mass, collected without design, and without any knowledge of the future; for, on the supposition of this knowledge, they would be endowed with the faculty of foreseeing what was perfectly useless. Is it not natural for animals, that have a fixed abode, to which they are accustomed to transport their provisions, to collect more than they can consume? Is not feeling alone, guided by the habit they have acquired of transporting their food, in order that they
may

may use it in tranquillity, sufficient to account for this phaenomenon? Does not this demonstrate that they are only endowed with feeling, and not with reason? For the same reason, bees collect more wax and honey than they have occasion for: Man profits not, therefore, by their intelligence, but by their stupidity. Intelligence would necessarily determine them to collect no more than they could consume, and to save themselves the trouble of amassing a superfluous quantity, especially after they learn from experience, that this labour is lost, that the overplus is uniformly taken from them, and that this abundance is the sole cause of the desolation and destruction of their society. What demonstrates this superfluous labour to be the effect of feeling alone is, that we can oblige them to work as much as we please. As long as there are flowers in any country, the bee continues to extract from them honey and wax. If bees were transported from one region to another, so as to afford them a constant succession of fresh flowers, their labours would never cease. The amassing disposition of the bee, therefore, is not an effect of foresight, but a movement produced by feeling; and this movement is continued as long as the objects which give rise to it exist.

I have bestowed particular attention on the oeconomy of field-mice. Their holes are generally divided into two apartments; in one of them they deposit their young, and, in the other,

other, every thing that is agreeable to their palates. When made by themselves, their holes are not large, and can receive only a small quantity of provisions: But, when they find a large space under the trunk of a tree, there they take up their abode, and fill it with all the grain, nuts, &c. they can collect. Hence the quantity of provisions amassed, instead of being proportioned to the wants of the animal, depend entirely on the capacity of the place where they happen to be deposited.

Thus the provisions of the ant, of the field-mouse, and of the bee, are discovered to be only useless and disproportioned masses, collected without any view to futurity, and the minute and particular laws of their pretended foresight are reduced to the general and real law of feeling. The sagacity and foresight ascribed to birds originate from the same cause. To account for the construction of their nests, it is unnecessary to have recourse to a particular law established by the Almighty in their favour. To this operation they are led by degrees. They first find a proper place, and then bring materials to render it more commodious. The nest is only a place which they can distinguish from all others, and where they can live in tranquillity. Love is the sentiment that stimulates and directs them in this operation. The male and female require the aid of each other. They feel a strong mutual attachment; they endeavour to conceal

Vol. III. P p themselves,

themselves, and to retire from the rest of the world, which is now become more dangerous to them than ever. They, therefore, retreat to the forest, to places the most obscure and inaccessible; and, to render their situation more comfortable, they collect straw, leaves, &c. and form them, with incessant labour, into a common habitation. Some, less dexterous or less sensual, make coarse and rude nests; others, contented with what they find already made, have no other habitation than the holes they meet with, or the nests which are presented to them. All those operations are effects of organization, and depend upon feeling, which, however exquisite in degree, can never produce reasoning; and still less can it produce that intuitive foresight, that certain knowledge of futurity, which have been ascribed to the feathered tribes.

This doctrine may be farther proved by a few familiar examples. Birds, instead of knowing the future, are even ignorant of what is past. A hen cannot distinguish her own eggs from those of another bird. She perceives not that the young ducks whom she has hatched belong not to her. She broods over chalk eggs, from which nothing can be produced, with equal industry as if they were her own. She has no knowledge, therefore, either of the past or the future, and is still more deceived with regard to the present. Why do not domestic poultry make nests as well as other birds? Is it because
the

the male belongs to many females? or rather, is it not because, being accustomed to be out of the reach of inconvenience and danger, they have no occasion to conceal themselves, no habit of seeking for safety in retreat and solitude? This admits of proof by facts; for wild birds of the same species perform actions which are entirely neglected when in a domestic state. The wild duck and wood-hen build nests; but none are made by these birds when domesticated. The nests of birds, therefore, the cells of bees, the collections of food laid up by the ant, the field-mouse, &c. suppose not any intelligence in those animals, nor proceed from particular laws established for each species, but depend, like every other animal operation, on number, figure, motion, organization, and feeling, which are general laws of nature, and common to all animated beings.

It is by no means astonishing that man, who is so little acquainted with himself, who so often confounds his sensations and ideas, who so seldom distinguishes the productions of the mind from those of the brain, should compare himself to the brute animals, and make the only difference between them consist in the greater or less perfection of their organs: It is not surprising that he should make them reason, understand, and determine in the same manner with himself; and that he should attribute to them not only those qualities which he possesses, but even those
of

of which he is deprived. Let man, however, examine, analyze, and contemplate himself, and he will soon discover the dignity of his being; he will perceive the existence of his soul; he will cease to degrade his nature; he will see, at one glance, the infinite distance placed by the Supreme Being between him and the brutes.

God alone knows the past, the present, and the future. Man, whose existence continues but a few moments, perceives only these moments: But a living and immortal power compares these moments, distinguishes and arranges them. It is by this power that man knows the present, judges of the past, and foresees the future. Deprive him of this divine light, and you deface and obscure his being; nothing will remain but an animal equally ignorant of the past and the future, and affectable only by present objects.

OF

OF DOMESTIC ANIMALS.

MAN changes the natural condition of animals, by forcing them to obey and to serve him. A domestic animal is a slave destined to the amusement, or to aid the operations of men. The abuses to which he is too frequently subjected, joined to the unnatural mode of his living, induce great alterations both in his manners and dispositions. But a savage animal, obedient to Nature alone, knows no laws but those of appetite and independence. Thus the history of savage animals is limited to a small number of facts, the results of pure Nature. But the history of domestic animals is complicated, and warped with every thing relative to the arts employed in taming and subduing the native wildness of their tempers : And, as we are ignorant what influence habit, restraint, and example, may have in changing the manners, determinations, movements, and inclinations of animals, it is the duty of the naturalist to examine them with care, and to distinguish those facts which depend solely on instinct, from those that originate from education ; to ascertain what is proper to them from what is borrowed ; to separate artifice from nature ; and never to con-
found

found the animal with the slave, the beast of burden with the creature of God.

Man holds a legitimate dominion over the brute animals, which no revolution can destroy. It is the dominion of mind over matter; a right of nature founded upon unalterable laws, a gift of the Almighty, by which man is enabled at all times to perceive the dignity of his being: For his power is not derived from his being the most perfect, the strongest, or the most dexterous of all animals. If he hold only the first rank in the order of animals, the inferior tribes would unite, and dispute his title to sovereignty. But man reigns and commands from the superiority of his nature: He thinks; and therefore he is master of all beings who are not endowed with this inestimable talent. Material bodies are likewise subject to his power: To his will they can oppose only a gross resistance, or an obstinate inflexibility, which his hand is always able to overcome, by making them act against each other. He is master of the vegetable tribes, which, by his industry, he can, at pleasure, augment or diminish, multiply or destroy. He reigns over the animal creation; because, like them, he is not only endowed with sentiment and the power of motion, but because he thinks, distinguishes ends and means, directs his actions, concert his operations, overcomes force by ingenuity, and swiftness by perseverance.

Among

Among animals, however, some are more soft and gentle, others more savage and ferocious. When we compare the docility and submissive temper of the dog with the fierceness and rapacity of the tiger, the one appears to be the friend, and the other the enemy of man. Thus his empire over the animals is not absolute. Many species elude his power, by the rapidity of their flight, by the swiftness of their course, by the obscurity of their retreats, by the element which they inhabit: Others escape him by the minuteness of their bodies; and others, instead of acknowledging their sovereign, attack him with open hostility. He is likewise insulted with the stings of insects; and the poisonous bites of serpents; and he is often incommoded with impure and useless creatures, which seem to exist for no other purpose but to form the shade between good and evil, and to make man feel how little, since his fall, he is respected.

But the empire of God must be distinguished from the limited dominion of man. God, the creator of all being, is the sole governour of nature: Man has no influence on the universe, the motions of the heavenly bodies, or the revolutions of the globe which he inhabits. He has no general dominion over animals, vegetables, or minerals. His power extends not to species, but is limited to individuals; for species and the great body of matter belongs to, or rather constitutes Nature. Every thing moves on, perishes,

or

or is renewed by an irresistible power. Man himself, hurried along by the torrent of time, cannot prolong his existence. Connected, by means of his body, to matter, he is forced to submit to the universal law, and, like all other organized beings, he is born, grows, and perishes.

But the ray of divinity with which man is animated, ennobles and elevates him above every material existence. This spiritual substance, so far from being subject to matter, is entitled to govern it; and though the mind cannot command the whole of nature, she rules over individual beings. God, the source of all light and of all intelligence, governs the universe, and every species, with infinite power: Man, who possesses only a ray of this intelligence, enjoys, accordingly, a power limited to individuals, and to small portions of matter.

It is, therefore, apparent, that man has been enabled to subdue the animal creation, not by force, or the other qualities of matter, but by the powers of his mind. In the first ages of the world, all animals were equally independent. Man, after he became criminal and savage, was not in a condition to tame them. Before he could distinguish, choice, and reduce animals to a domestic state, before he could instruct and command them, he behoved to be civilized himself; and the empire over the animals, like all other empires, could not be established previous to the institution of society.

Man

Man derives all his power from society, which matures his reason, exercises his genius, and unites his force. Before the formation of society, man was perhaps the most savage and the least formidable of all animals. Naked, without shelter, and destitute of arms, the earth was to him only a vast desert peopled with monsters, of which he often became the prey: And, even long after this period, history informs us, that the first heroes were only destroyers of wild beasts.

But, when the human species multiplied and spread over the earth, and when, by means of society and the arts, man was enabled to conquer the universe, he made the wild beasts gradually retire; he purged the earth of those gigantic animals, whose enormous bones are still to be found; he destroyed, or reduced to a small number, the voracious and hurtful species; he opposed one animal to another; and, subduing some by address, and others by force, and attacking all by reason and art, he acquired to himself perfect security, and established an empire, which knows no other limits than inaccessible solitudes, burning sands, frozen mountains, or dark caverns, which serve as retreats to a few species of ferocious animals.

Man derives all his power from society, which
 - But his reason, which is his genius, and u-
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 - Thus his force, before the formation of society,
 - than was perhaps the wolf is, and the rest
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H O R S E
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 - long after this period, history informs us that

THE reduction of the horse to a domestic
 state, is the greatest acquisition, from the
 animal world, ever made by the art and indu-
 stry of man. This noble animal partakes of the
 fatigues of war, and seems to feel the glory of
 victory. Equally intrepid as his master, he en-
 counters danger and death with ardour and
 magnanimity. He delights in the noise and tu-
 mult of arms, and annoys the enemy with reso-
 lution and alacrity. But it is not in perils and
 conflicts alone that the horse willingly co-ope-
 rates with his master; he likewise participates
 of human pleasures. He exults in the chase
 and the tournament; his eyes sparkle with e-
 mulation in the course. But, though bold and
 intrepid, he suffers not himself to be carried off
 by a furious ardour; he represses his movements,
 and knows how to govern and check the natu-
 ral

* *Equus caballus*, cauda undique setosa; *Linn. Syst. Nat.*
 p. 100.

Horse—Hoof consisting of one piece; six cutting teeth in
 each jaw; *Pennant, Synops. of quadrup.* p. 1.

ral vivacity and fire of his temper. He not only yields to the hand, but seems to consult the inclination of the rider. Uniformly obedient to the impressions he receives, he flies or stops, and regulates his motions entirely by the will of his master. He, in some measure, renounces his very existence to the pleasure of man. He delivers up his whole powers; he reserves nothing, and often dies rather than disobey the mandates of his governor.

These are features in the character of the horse whose natural qualities have been matured by art, and tamed with care to the service of man. His education commences with the loss of liberty, and is completed by restraint. The slavery of the horse is so antient and so universal, that he is rarely seen in a natural state. When employed in labour, he is always covered with the harness; and, even during the time destined for repose, he is never entirely delivered from bonds. If sometimes permitted to roam in the pastures, he always bears the marks of servitude, and often the external impressions of labour and pain. His mouth is deformed by the perpetual friction of the bit; his sides are galled with wounds, or furrowed with cicatrices; and his hoofs are pierced with nails. The natural gestures of his body are constrained by the habitual pressure of fetters, from which it would be in vain to deliver him; for he would not be more at liberty. Those horses, the servitude of which is most mild,

mild, which are kept solely for the purposes of luxury and magnificence, and whose golden chains only gratify the vanity of their masters, are more dishonoured by the elegance of their trappings, and by the plaits of their hair, than by the iron shoes on their feet.

Art is always excelled by nature; and, in animated beings, liberty of movement constitutes the perfection of their existence. Examine those horses which have multiplied so prodigiously in Spanish America, and live in perfect freedom. Their motions are neither constrained nor measured. Proud of their independence, they fly from the presence of man, and disdain all his care. They search for, and procure the food that is most salutary and agreeable. They wander and frisk about in immense meadows, and collect the fresh productions of a perpetual spring. Without any fixed habitation, or other shelter than a serene sky, they breathe a purer air than in those musty vaults in which we confine them, when subjected to our dominion. Hence wild horses are stronger, lighter, and more nervous than most of those which are in a domestic state. The former possess force and dignity, which are the gifts of nature; the latter have only address and gracefulness, which are all that art can bestow.

These wild horses are by no means ferocious in their temper; they are only wild and fiery. Though of strength superior to most animals,

imals; they never make an attack. But, when they are assailed, they either disdain the enemy, frisk out of his way, or strike him dead with their heels. They associate in troops from no other motive than the pleasure of being together; for they have no fear; but acquire a mutual attachment to each other. As grass and vegetables constitute their food, of which they have enough to satisfy their appetite, and, as they are not carnivorous, they neither make war with other animals, nor among themselves. They dispute not about their common nourishment, and never have occasion to snatch prey from each other, the general source of quarrels and combats among the rapacious tribes. Hence they live in perpetual peace; because their appetites are simple and moderate, and they have no objects to excite envy.

All these features are apparent in young horses, bred together in troops. Their manners are gentle, and their tempers social; their force and ardour are generally rendered conspicuous by marks of emulation. They anxiously press to be foremost in the course, to brave danger in traversing a river, or in leaping a ditch or precipice; and, it has been remarked, that those which are most adventurous and expert in these natural exercises, are the most generous, mild, and tractable, when reduced to a domestic state.

Wild horses are mentioned by several antient authors. Herodotus takes notice of white savage

wild horses on the banks of the Hypanis in Scythia; and, in the northern part of Thrace, beyond the Danube, he remarks, there were wild horses, covered all over with hair, five inches long: Aristotle says, they were to be found in Syria; Pliny, in the northern regions; and Strabo, in Spain and the Alps. Among the moderns, Cardan says the same thing of Scotland, and the Orkney isles*; Olaus, of Muscovy; Dapper, of the island of Cyprus, where he says, there were beautiful wild horses, of great strength and swiftness†; and Struys, of the island of May, one of the Cape de Verdes, where he saw wild horses of a small stature‡. Leo of Africa likewise relates, that there were wild horses in the deserts of Africa and Arabia; and he assures us, that he saw, in the solitudes of Numidia, a colt with white hair, and a crisped mane||. Marmol confirms this fact, by informing us, that small wild horses, some of them of an ash-colour, and others white, with short curled hair and manes, are to be found in the Libyan and Arabian deserts§: He adds, that they out-run the dogs and domestic horses. We likewise learn, from the *Lettres Edifiantes***, that there are small wild horses in China.

But,

* Aldrovand. de quadrup. foliped. lib. 1. p. 19.

† See la description des isles de l'Archipel. p. 50.

‡ Voyages de Struys, tom. 1. p. 11.

§ Description d'Afrique, part 2. vol. 2. p. 750.

§ L'Afrique de Marmol, tom. 1. p. 50.

** Lettres Edifiantes, recueil 26. p. 371.

But, as Europe is now almost equally peopled, wild horses are no where to be found in this quarter of the globe. Those in America are the offspring of domestic horses, transported originally from Europe by the Spaniards. In these uninhabited, or rather depopulated regions, horses have multiplied prodigiously. That this species of animal was unknown in the New World, appears from the terror and astonishment expressed by the Mexicans and Peruvians at the sight of horses and their riders. The Spaniards carried great numbers of horses to these regions, both with a view to their service, and to the propagation of the breed. Many were, accordingly, left on the islands, as well as on the Continent, where they have multiplied like other wild animals. M. le Salle *, in the year 1685, saw, near the bay of St Louis, in North America, these horses grazing in the meadows; and they were so wild that he could not approach them. The author of the history of the Bucaniers † remarks, ' That troops of horses, to the number of 500, are sometimes seen in the island of St Domingo, who all run together; that, when they perceive a man, they all stop; and that one of them approaches to a certain distance, blows through his nostrils, takes flight, and is instantly followed by the whole

* See les dernières decouvertes dans l'Amer. septen. de M. de Salle, p. 250.

† L'Hist. des avantur. flibustiers, tom. 1. p. 110.

'whole troop.' He adds, that he is uncertain whether these horses have degenerated by becoming wild; but that he found none of them so handsome as those of Spain, though they sprung from the same race. They have, he continues, very gross heads and limbs, and long necks and ears. The inhabitants tame them with ease, and then train them to labour. In taking them, gins of ropes are laid in the places where they frequent. When caught by the neck, they soon strangle themselves, unless some person arrives to disentangle them. They are tied to trees by the body and limbs, where they are left for two days without victuals or drink. This trial is generally sufficient for rendering them more tractable, and they soon become as gentle as if they had never been wild; and, even if they should by accident regain their liberty, they never resume their savage state, but know their masters, and allow themselves to be approached, and retaken with ease*.

These

* M. Garfault mentions another method of taming wild horses. 'When the colts,' he observes, 'are not very early tamed, it sometimes happens, that the approach of man strikes them with terror; that they defend themselves with their heels and teeth, in such a manner, that it is almost impossible to dress or shoe them: If not broke by gentleness and patience, they are prevented from sleeping till they fall down with weakness. During this operation, a man continues, day and night, at their heads, giving them, from

time

These facts prove horses to be naturally of gentle dispositions, and much disposed to associate with man. They never forsake the abodes of men, to regain their liberty in the forests. They discover, on the contrary, great anxiety to return to the stable, where they find only coarse food, which is always the same, and often measured to them more by the rules of oeconomy, than by the strength of their appetite. But the sweets of habit supply all they have lost by slavery. After being oppressed with fatigue, the place of repose is full of delight. They smell it at a distance, can distinguish it in the midst of great cities, and seem uniformly to prefer bondage to liberty. They form a second nature out of those habits to which they have been forced to submit; for horses, after being abandoned in the forests, have been known to neigh continually, in order to be heard, to run to the voice of man, and even to grow meagre, and die in a short time, though surrounded with a profusion of nourishment.

Thus, it is obvious, the manners of a horse originate entirely from his education, which is accomplished by a care and industry bestowed by man upon no other animal; but he is amply rewarded by the perpetual services of this noble and laborious creature.

VOL. III.

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The

- time to time, handfuls of hay. When treated in this manner, it is astonishing how soon their tempers are softened.
- Some horses, however, require to be kept awake for eight
- days.' See *Nouveau parfait Maréchal*, p. 89.

The foals are separated from their mothers at the age of five, six, or at most seven months; for experience shows, that, when allowed to suck ten or eleven months, though generally fatter and larger, they are not of equal value as those which have been more early weaned. After six or seven months, the foals are removed from their mothers, and are fed twice a-day with bran and a little hay, the quantity of which is augmented in proportion as they advance in age. They are confined to the stables as long as they discover any anxiety to return to their mothers. But when this inquietude is gone, they are allowed to go out, and are conducted to the pasture: They must not, however, be permitted to graze when their stomach is empty. An hour before being put to the grass, they should have a little bran, be made to drink, and should never be exposed to great colds or to rain. In this manner they pass the first winter. In the month of May following, they may be allowed to pasture freely every day, and to remain out continually till the end of October, only observing not to permit them to eat the after-maths. If accustomed to feed upon this delicate herbage, they will reject hay, which ought nevertheless, together with bran, to be their principal food during the second winter. They are managed in the same manner, namely, allowing them to pasture in winter during the day, and in summer during both day and night,
till

till they arrive at the age of four years, when they are confined to dry food *. This change of nourishment requires some precautions. During the first eight days, they should have only straw; and a few vermifuge draughts may be given, to destroy those worms which may have been engendered by the bad digestion of crude herbs. M. de Garfaut † recommends this practice, the utility of which he had often experienced. It is, however, an established fact, that the stomachs of horses, at all ages, and in all circumstances, whether they feed upon grass, or upon oats and hay, are perpetually stuffed with a prodigious multitude of worms ‡. The stomach of the ass is always in the same condition; and yet none of these animals are incommoded by this species of vermin. These worms, therefore, ought not to be regarded as an accidental malady, occasioned by the indigestion of crude herbs, but rather as an effect depending on the common food and ordinary digestion of the horse and ass.

After young colts are weaned, they should not be put into too warm a stable, otherwise they will be rendered too delicate and too sensible to the impressions of the air. They should be

* This may be the practice in France; but, in Britain, horses, of all ages, are allowed to pasture freely in summer, without receiving any injury.

† Nouveau parfait Maréchal, p. 84.

‡ This assertion appears to be too general; for, in this country, at least, worms are by no means so frequent.

be often supplied with fresh litter, and kept clean by frequent friction. But they ought neither to be tied nor handled till they are near three years of age. The manger and rack should not be too high; for the necessity of stretching their neck and raising their head, may induce a habit of keeping them in that position, which would spoil their neck. When 12 or 18 months old, their tails should be cut; the hair will shoot afterwards, and become stronger and thicker. At the age of two years, the male colts should be put with the horses, and the females with the mares. Without this precaution, the young males would fatigue and enervate themselves.

At the age of three years, or three and a half, we should begin to dress the colts, and to render them tractable. At first, a light easy saddle should be placed on them, and allowed to remain two or three hours each day. They should likewise be accustomed to receive a snaffle into their mouths, and to allow their feet to be lifted and struck, in imitation of shoeing. If destined for the coach or the draught, they ought to be harnessed as well as snaffled. A bridle is unnecessary at first: By means of a halter or cavesson on their nose, they may be made to trot up and down on a smooth piece of ground, with only a saddle and harness on their bodies: And, when they turn easily, and approach, without fear, the man who holds the *longe* or halter, they may then be mounted and dismounted, without making

making them walk, till they be four years old; for, before this period, a horse has not strength enough to walk with a rider on his back. But, at four years, they may be mounted, and walked or trotted at small intervals *. When a coach-horse is accustomed to the harness, he may be yoked with a bred horse, and guided with a *longe* or halter passed through the bridle, till he begins to know his duty. The coachman may next try to make him draw, with the assistance of a man to push him gently behind, and even to give him some slight lashes. All this education should be gone through, before the young horses have their diet changed; for, after being fed with grain or straw, they are more vigorous, and consequently less docile, and more difficult to break †.

The bit and the spur have been contrived to command the obedience of horses; the bit for the direction, and the spur for the quickness of their movements. Nature seems to have destined the mouth solely for receiving the impressions of taste and of appetite. But the mouth of the horse

* See *Elemens de cavalerie* de M. de la Guerinier, tom. 1. p. 140. † *Le nouveau parfait Maréchal*, par M. de Garfault, p. 86.

‡ By this management, it is admitted, that horses may be easier broke. But, after they are allowed a full and generous diet, they are apt to become vicious and unruly. For this reason, connoisseurs in horsemanship maintain, that, to break horses when they are in the highest order and best fed, is by much the most preferable mode.

horse is endowed with such an amazing sensibility, that, to this organ, in place of the eye and ear, man applies for conveying the indications of his will to this animal. The slightest motion or pressure of the bit gives him notice, and determines his course. This organ of sensation has no fault but that of perfection ; its too great sensibility requires the most dexterous management ; for the smallest abuse spoils the mouth, by rendering it insensible to the impressions of the bit. The senses of seeing and hearing cannot be blunted in this manner : But it is probable, that all attempts to govern horses by these organs have been found inconvenient. Besides, the signs transmitted by the touch have a stronger effect upon animals in general, than those conveyed by the eye or ear. The situation of a horse's eyes, with regard to his rider or conductor, is extremely unfavourable : And, though they be often animated and conducted by the ear, it appears that the use of this organ is abandoned to the coarser species of horses ; for, in the menage, they are seldom addressed by the ear. In a word, when horses are well educated, the smallest pressure of the thighs, the slightest movement of the bit, are sufficient to direct them. Even the spur is almost useless, being seldom employed but to force them to exert violent motions : And when, from the ignorance of the horseman, he gives the spur, and at the same time retracts the bridle, the horse, finding himself incited on
one

one side and restrained on the other, is obliged to rear, or make a perpendicular bound.

By means of the bridle, the horse is taught to keep his head in the most beautiful and advantageous situation, and the smallest sign or slightest movement of the rider is sufficient to make the animal assume its different paces. The trot is perhaps the most natural motion of a horse; but the pace, and even the gallop, are most easy to the rider; and these are the two motions which are most in request. When a horse lifts his fore-leg in order to walk, this movement must be made with steadiness and facility, and the knee must likewise be bended. The lifted leg must appear, for a moment, to be supported, and when let down, it must be firm, and equally supported on the ground, before the head receive any impression from this movement; for, when the leg falls suddenly down, and the head sinks at the same time, this motion is generally made to give a speedy relief to the other leg, which is not strong enough alone to support the whole weight of the body. This is a very great defect in a horse. It is also worthy of remark, that, when he rests on his heels, it is a sign of weakness*; and when he supports himself on his toes, it is an unnatural and fatiguing attitude, which the horse cannot long continue.

Walking

* The only sure mark of strength and soundness in a horse, is when he rests firmly upon his foot, without favouring any particular part of it.

Walking, though the slowest of all motions, ought to be brisk, light, and neither too long nor too short. Lightness depends much on the freedom of the shoulders, and is distinguished by the manner in which the horse, in walking, carries his head. If he carries his head high and steady, he is generally vigorous and light. When the movement of the shoulders is not sufficiently free, the limbs are not lifted high enough, and the horse is apt to stumble upon the road. In walking, a horse should raise his shoulders, and lower his haunches *. He should also ele-

vate

* It may be of use to introduce here an explanation of the technical terms generally employed to express the different external parts of a horse. See the plate of the horse.

A The two bones corresponding to the *temples* of a man, and called by the same name.

B The *eye-pits*, or two cavities between the eye and ear, above the eye-brows.

C The *vices*. The parotid glands, situated between the ear, and the locking of the under jaw.

D The *face* or *chanfrin*. The fore part of the head from the eyes to the nostrils.

E The *rim of the nostrils*. The cartilage which forms the circular aperture of the nostrils, and terminates them above and below.

F *Tip of the nose*. The partition which divides the nostrils, terminating at the upper lip.

G to H The bones of the lower jaw.

H The *chin*.

I The beard.

Gatherers. The two fore teeth.

Middle teeth. Those adjoining to the gatherers.

Corner teeth. The last on each side.

Tusk.

vate and support his leg; but, if he supports it too long, and allows it to fall down slowly, he loses

Tusks. The two canine teeth on each side, and in each jaw.

Bar. The spaces between the cutting teeth and grinders, filled with ridges, which run across the palate.

K The *Neck*, which is bounded above by the mane, and below by the throat, extending from the shoulders to the head.

L The *Tuft* or *Toupet*. That part of the mane which lies between the two ears, and hangs down on the front.

M. The *Withers*. The place where the two shoulders approach each other between the neck and back.

N The *Shoulders*, extending from the withers *M*, to the top of the *fore-band*, or *fore-leg* *O*.

P The *Chest* or breast.

Q The *Back*, reaching from the withers *M*, to the reins *S*.

R The *Navel*. The part between the back and reins, a very absurd term, as the *navel* is in the lower part of the belly.

S. The *Reins*. This term is often used, though improperly, to express the whole spine of the horse.

T The *Sides*, which are formed and limited by the ribs.

V The *Coffer*. The hollow formed by the contour of the ribs. The name *Belly* is given to the part extending from *V* to the flank.

X The *Flank*. The extremity of the belly, at the termination of the ribs, below the kidneys, and reaching to the haunch-bone.

Y The *Haunch*, formed, as in man, by the haunch-bone.

Z The *Crupper*, which is round, and reaches from the kidneys to the tail.

The *Tail* is distinguished by two parts, the *hair* and the *rump*.

a The *Buttocks*, are situated below the crupper and the origin of the tail, and extend to the place where the hind leg joins the body.

b The *Shoulder-blade*. *c.* The *humerus*. Both of these are included by horsemen under the name of *Shoulder*.

d The *Elbow*.

e The *Arm*.

loses every advantage of lightness; his walk becomes hard, and he is good for nothing but state and parade.

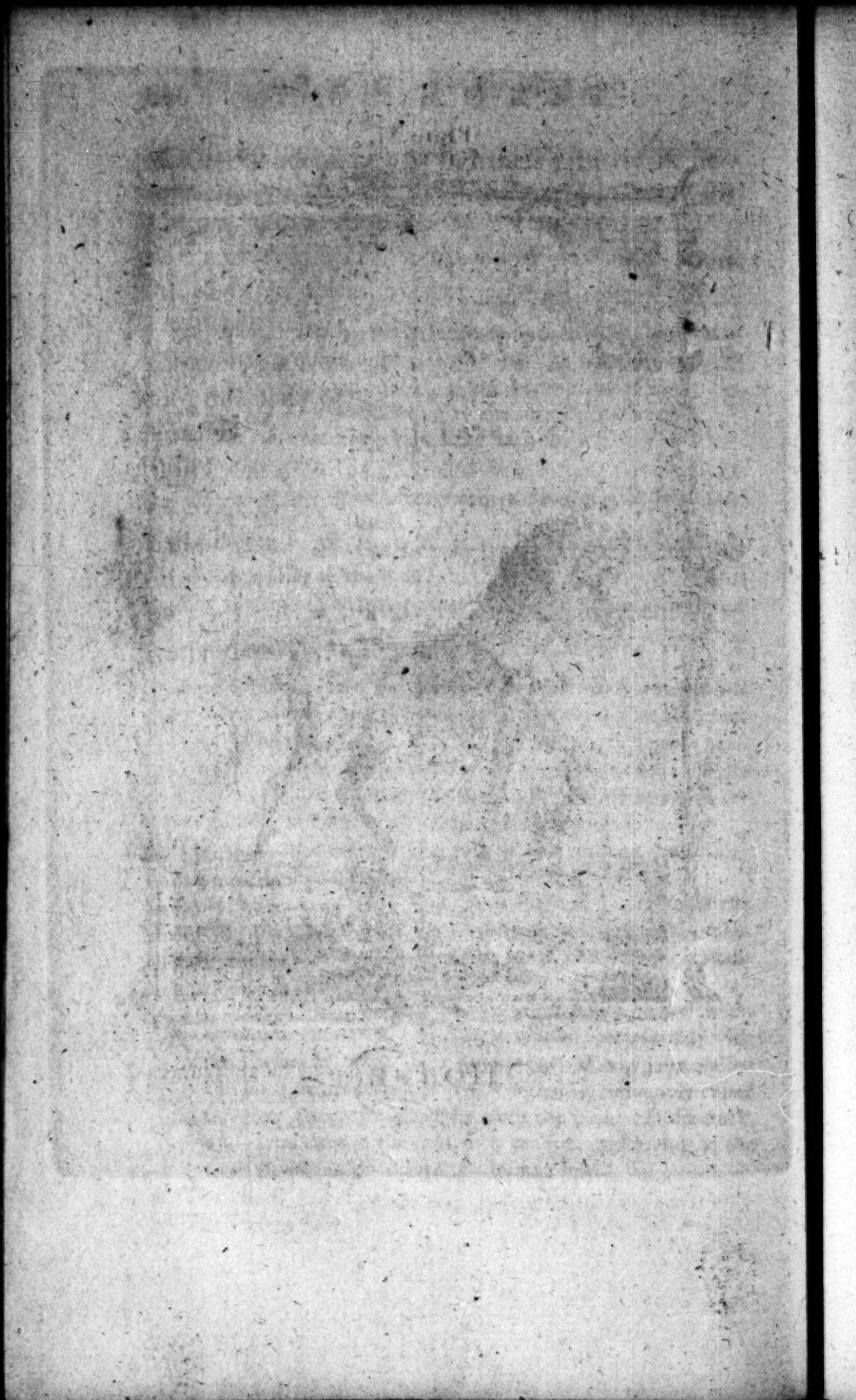
But

- f The *Knee*, or joint situated below the arm, a term improperly applied to a horse, as it corresponds to the wrist in man.
- g The *Shank* or *cannon*. The second part of the fore-leg. It begins at the articulation of the knee, terminates at the fetlock joint, and answers to the metacarpus in man.
- h The *Tendon*, commonly called the back-sinew.
- i The *Fetlock* joint.
- k The *Tuft* of hair which surrounds a kind of soft horn situated behind the shank.
- l The *Pasterns*. That part of the leg which extends from the fetlock-joint to the hoof.
- m The *Coronet*. The place where the hoof joins the leg, and is decorated with long hair, falling down all around the hoof.
- n The *Hoof* represents the nail in man; the fore-part of it is called the *Toe*, and the sides the *Quarters*. The hind part of the hoof is a little raised, and divided into two parts, both included under the name *Heel*: They extend to the middle of the under part of the foot, and uniting again under the sole, or bottom of the foot, form the *Frog*.
- p The *Stifle*, is properly the articulation of the knee, and contains the knee-pan.
- q The *Thigh*. It extends from the stifle and extremity of the buttocks to the ham, and answers to the leg in man. Accordingly, the horse's thigh has a fleshy part, resembling the calf of a human leg.
- r The *Hock* or *ham*, is the joint at the extremity of the thigh, and bends forwards. This articulation corresponds with the *Tarsus* in man. The hinder part of the joint called the hock, is properly the *Heel*. What is commonly called the *great sinew*, which arises from the point of the hock, and terminates in the foot, is a tendon, answering to the *tendo Achillis* inserted into the human heel.
- s The *Shank*.
- x The *Pastern-joint*.

Plate XI.



HORSE



But lightness is not the only good quality in the movements of the horse: They should likewise be equal and uniform both before and behind: For, if the crupper vibrates when the shoulders are supported, his motion will be jolting and incommodious to the rider. The same thing happens, when the horse lengthens so much the step of the hind-leg, that the foot lights beyond the print of the fore-foot. Horses with short bodies are subject to this fault. Those whose legs cross each other, or hew, have an unsteady motion; and, in general, long-bodied horses are most commodious to the rider, because he is placed at a greater distance from the two centres of motion, the shoulders and haunches, and is of course less jolted.

The

y The Pasterns.

z The Foot, as in the fore-leg.

This explanation of the particular terms, will render the general ones more easy and simple. A horse is divided into three principal parts, the *fore-band*, the *body* or *carcase*, and the *hind-band*. The *fore-band* includes the head, neck, withers, breast, and fore-legs. The body is composed of the back, kidneys, ribs, belly, and flanks. The *hind-band* comprehends the rump, haunches, tail, buttocks, stifle, thighs, hocks, and the other parts of the hind-legs.

By another mode of division, the horse is distinguished into four parts, the head, the body, and the fore and hind trains. The *body* is composed of the back, the kidneys, the belly, the ribs, and the flanks. The *fore-train* consists of the neck, the shoulders, the breast, and the fore-legs; and the *hind-train*, of the rump, the tail, the haunches, and the hind-legs.

The general mode of walking among quadrupeds is to lift, at one time, a fore-leg and a hind-leg of opposite sides. As their bodies rest on four points which form an oblong square, the most commodious manner of moving is to change two at a time in the diagonal; so that the centre of gravity of the animal's body may always remain nearly in the direction of the two points of support which are not in motion. In the three natural movements of the horse, namely, the walk, the trot, and the gallop, this mode is always observed, though with some variations. In walking there are four beats or times of moving: If the right fore-leg moves first, the left hind-leg instantly follows; then the left fore-leg moves, and is instantly followed by the right hind-leg. Thus the right fore-foot rests first on the ground, then the left hind-foot, next the left fore-foot, and, lastly, the right hind-foot, which makes a motion consisting of four beats and three intervals, of which the first and third are shorter than the middle one. In the trot, there are only two beats: If the right fore-leg parts from the ground, it is accompanied, at the same time, by the left hind-leg; then the left fore-leg moves at the same time with the right hind-leg; so that, in this motion, there are but two beats and one interval; the right fore-leg and the left hind-leg rests on the ground at the same time, and the same thing happens with regard to the left fore-leg and the right hind-leg. In the gallop,
there

there are commonly three beats : The left hind-leg moves first and rests first on the ground ; then the right hind-leg is raised along with the left fore-leg, and both rest on the ground at the same time ; and, lastly, the right fore-leg is raised instantly after the left fore-leg and the right hind-leg, and falls last upon the ground. Thus in the gallop, there are three beats and two intervals : In the first interval, when the motion is quick, the four legs, for an instant, are in the air at the same time, and the four shoes appear at once. When the horse has supple limbs and haunches, and moves with agility, the gallop is most perfect, and the feet fall at four times, first, the left hind-leg, then the right hind-leg, next the left fore-leg, and, lastly, the right fore-leg.

Horses generally gallop upon the right foot, in the same manner as they set out in walking or trotting, with the right fore-leg. In galloping, they first cut the road with the right fore-leg, which is farther advanced than the left ; and the right hind-leg, which immediately follows the right fore-leg, is likewise farther advanced than the left hind-leg. Hence the left leg, which bears the whole weight, and pushes the others forward, has the greatest fatigue ; so that it would be proper to learn horses to gallop alternately upon the left and right legs ; because it would enable them to continue this violent motion much longer. This is practised at the menage,

menage, but perhaps for no other reason, but because, in galloping round a circle, the centre of which is sometimes on the right, and sometimes on the left, the rider is frequently obliged to change his hand.

In walking, the horse raises his feet very little above the surface; in trotting, he elevates them a little more, and, in galloping, still higher. The walk ought to be smart, light, and sure; the trot should be firm, quick, and equally supported, and the fore-legs pushed with rapidity by the hind ones. The trotting horse should carry his head pretty high, and keep his body straight; for, if the haunches rise and fall alternately at every movement, and if the crupper rocks, the animal is too weak for this motion. To throw the fore-legs out, is another fault: They ought always to be on the same line with those behind, and to efface their prints *. When one of the hind-legs moves, and if the fore-leg on the same side rests too long, the movement becomes hard by this resistance. It is for this reason, that the interval between the two beats of the trot ought to be short: But, however short it may be, this resistance is sufficient to make the trot harder than the walk or gallop.

The

* Here the author differs from all our expert horsemen, who uniformly prefer those horses which go wider behind than before; because horses of this kind are not so apt to cut their legs, are more agile in their movements, and can support greater fatigue in long journies, &c.

The spring of the hocks contributes as much to the motion of galloping as that of the loins. While the latter make an effort to elevate and push forward the anterior parts, the spring of the hocks breaks the stroke and softens the shock. Hence the more uniform and strong the spring of the hocks, the gallop is softer and more rapid.

Though walking, trotting, and galloping be the natural and ordinary movements of horses, yet some of them have another natural motion, known by the name of *ambling*, or *pacing*, which is very different from the other three; and, though less quick than the hard trot or gallop, it appears, at first sight, to be extremely fatiguing to the animal. The foot of the horse, in this movement, grazes the surface still nearer than in walking, and each step is much longer. But, what is singular, to make a pace, the two legs of the same side part from the ground at the same time, the fore and hind leg, for example, of the right side, and then the two legs of the left side; so that each side of the body alternately want support, which must greatly fatigue the animal, who is obliged to support a balance forced by the rapidity of a movement which is hardly elevated above the ground; for nothing but the rapidity of the motion, and the smallness of the elevation, could possibly prevent the creature from falling on his side. In the motion of pacing, as in that of trotting, there are
only

only two beats. This movement, which is very laborious to the horse, and in which he ought not to be indulged excepting on smooth ground, is very easy to the rider; it has not the hardness of the trot, because the hind leg moves along with the fore one, and creates no resistance to the motion. We are told by connoisseurs, that horses which naturally amble, never trot, and that they are much weaker than those that have no such movement. Colts, indeed, often assume this mode of moving, when forced to go quick, and when they have not strength enough to trot or to gallop; and even good horses, after being fatigued, or when they begin to decay, are apt, when pushed, to amble spontaneously*.

The amble may therefore be regarded as a motion occasioned by weakness or defect. But there are two other movements assumed spontaneously by weak or decayed horses, which are still more defective than that of the amble, and are known by the name of *Broken ambles*. The one is a motion between walking and ambling, and the other between trotting and galloping. Both proceed from great fatigue, or weakness in the loins, and are conspicuous in many of our hackney and post-horses.

Of all quadrupeds, the horse possesses, along with grandeur of stature, the greatest elegance and proportion of parts. By comparing him with the animals immediately above or below him,

* See l'Ecole de cavalerie de M. de la Guérinière, p. 77.

him, we find that the ass is ill made; that the head of the lion is too large; that the limbs of the ox are too slender and too short, in proportion to the size of his body; that the camel is deformed; and that the grosser animals, as the rhinoceros and elephant, may be considered as rude and shapeless masses. The great difference between the head of man and that of the quadrupeds, consists in the length of their jaws, which is the most ignoble of all characters. But, though the jaws of the horse be very long, he has not, like the ass, an air of imbecility, nor, like the ox, of stupidity. The regularity and proportion of the parts of his head give him a light and sprightly aspect, which is well supported by the beauty of his chest. He elevates his head, as if anxious to exalt himself above the condition of quadrupeds. In this noble attitude, he regards man face to face. His eyes are open and lively, his ears handsome and of a proper height, being neither too long, like those of the ass, nor too short, like those of the bull. His mane adorns his neck, and gives him the appearance of strength and of courage. His long bushy tail covers and terminates with advantage the extremity of his body. His tail, very different from the short tails of the deer, elephant, &c. and from the naked tails of the ass, camel, rhinoceros, &c. is formed of long thick hairs which seem to arise from his crupper, because the trunk from which they proceed is very short.

He cannot, like the lion, elevate his tail, but, though pendulous, it becomes him better; And, as he can move it from side to side, it serves him to drive off the flies which incommode him; for, though his skin be very firm, and well garnished with close hair, it fails not to be extremely sensible.

The attitude of the head and neck contributes more than all the other parts of his body, to give him a graceful aspect. The superior part of the neck from which the mane issues, should first rise in a straight line from the withers, and then, as it approaches the head, form a curve nearly similar to that of a swan's neck. The inferior part of the neck should have no curvature, but rise in a straight line from the poutrel, or breast, to the under jaw, with a small inclination forward. If it rose in a perpendicular direction, its symmetry and gracefulness would be diminished. The superior part of the neck should be thin, with little flesh near the mane, which ought to be garnished with long delicate hair. A fine neck should be long and elevated, but proportioned to the general size of the animal. When too long, the horse commonly throws back his head; and, when too short and fleshy, the head is heavy to the hand. The most advantageous position of the head is, when the front is perpendicular to the horizon.

The head of a horse should be thin and meagre, and not too long. The ears should be small,

small, erect, but not too stiff, narrow, and placed on the upper part of the head, at a proper distance from each other. The front should be narrow and a little convex, the eye-pits, or spaces between the eyes and ears, well filled, and the eye-lids thin; the eyes should be pretty large and prominent, clear, lively, and full of fire; the pupil should be rather large, the under jaw a little thick, but not fleshy, the nose somewhat arched, the nostrils open and deep, and divided by a thin septum or partition. The mouth should be delicate and moderately split, lips thin, the withers sharp and elevated, the shoulders flat, and not confined; the back equal, a little arched lengthways, and raised on each side of the back-bone, which ought to have the appearance of being sunk; the flanks should be short and full, the crupper round and plump, the haunches well furnished with muscular flesh, the dock or fleshy part of the tail firm and thick, the thighs large and fleshy, the hock round before, broad on the sides, and tendinous behind; the shank thin before, and broad on the sides; the tendon, (or tendo Achillis) prominent, strong, and well detached from the leg-bone, and the fetlock somewhat prominent, and garnished with a small tuft of long hair behind; the pasterns should be of a middling length, and pretty large; the coronet a little elevated, the hoof black, solid, and shining, the instep high, the quarters round, the heels broad, and a little prominent, the

the frog thin and small, and the sole thick and concave.

Few horses possess all these perfections. The eyes are subject to many faults, which it is often difficult to distinguish. In a sound eye, two or three foot-coloured spots appear through the cornea above the pupil; for, unless the cornea be clean and transparent, these spots cannot be seen. When the pupil is small, long, and narrow, or surrounded with a white circle, or when it is of a greenish blue colour, the eye is unquestionably bad*.

Without entering into a long detail, the following general remarks will enable the reader to form a judgment of the principal perfections and imperfections of a horse. The motion of the ears affords a tolerable criterion: When a horse walks, the point of his ears should incline forwards; when fatigued, his ears hang down; and, when angry, or of a malignant disposition, he points alternately one of his ears forwards, and another backwards. Every horse turns his ears to that side from which he hears any noise; and, when struck on the back or on the crupper, he turns his ears backward. Horses with hollow eyes, or with one eye smaller than the other, have generally a bad sight. Those whose mouths are dry, have not such good constitutions

as

* There are many other marks of bad eyes; but, as their colour depends much on the light in which they are viewed, little information can be derived from it.

as those that have moist mouths, and foam with the bit *. The shoulders of a saddle-horse should be flat, supple, and not too fleshy. A draught-horse, on the contrary, ought to have thick, round, fleshy shoulders. If, however, the shoulders of a saddle-horse be too meagre, and the bones advance too much through the skin, it is an indication that his shoulders are not free, and that, of course, he will be unable to undergo much fatigue. Another defect of a saddle-horse is to have the poitrel, or breast, too prominent, and the fore-legs inclined or placed too far backward; because, in this case, he is subject to lean heavy upon the hand in galloping, and even to stumble and fall. The length of the legs should be proportioned to the stature of the horse. When the fore-legs are too long, he is not steady on his feet; and, when too short, he bears heavy on the hand. It has been remarked, that mares are more liable than horses to be low before, and that stone-horses have thicker necks than mares or geldings.

It is of great importance to know the age of a horse. The eye-pits of old horses are commonly hollow: But this mark is equivocal; for young horses begot by old stallions have likewise hollow eye-pits. The teeth afford the best criterion of the age of horses. The horse has, in all, 40 teeth, viz. 24 grinders, 4 canine, or tusks, and

12

* A dry or wet mouth is a consequence of the particular state of the body at the time; and, therefore, can be no indication of the general constitution or strength of a horse.

~~12~~ fore-teeth. Mares have either no dog-teeth, or very short ones. The canine and fore-teeth only afford indications of the age. Five days after birth, the fore-teeth begin to shoot. These first teeth are round, short, and not very solid; and they fall out, at different times, to be replaced by others. At two years and a half, the four middle fore-teeth fall out, two above and two below. The next year, other four are shed, one on each side of the first, which are now replaced. At four years and a half, other four fall out, always on each side of those that were formerly shed and replaced. These last four foal-teeth are succeeded by other four, which grow not near so quickly as the first eight. It is from these four, called corner teeth, that the age of a horse is distinguished; and they are easily known, being always the third, both above and below, reckoning from the middle to the extremity of the jaw. They are hollow, and have a black mark in their cavities. At four and a half, or five years, these teeth hardly rise above the gums, and their cavities are very perceptible. At six years and a half, the cavities begin to fill up, and the mark gradually diminishes till the animal is seven and a half, or eight years, when the cavities are perfectly filled, and the mark totally effaced. After this period, the age is attempted to be discovered by the tushes or canine teeth. These four teeth lie immediately adjacent to the other four
above

above described. Neither the tushes nor grinders shed. At the age of three years and a half, the two tushes of the under jaw generally begin to shoot; the two of the upper jaw appear at the age of four, and, till six years be completed, they are very sharp. At ten years, the tushes of the upper jaw seem to be blunted, worn out, and long, because the gums retract with age; and the more this appearance takes place, the older is the horse. From ten to thirteen or fourteen years, there are hardly any marks by which the age may be discovered. Some hairs of the eye-brows, indeed, begin to grow white; but this mark is equally equivocal as that derived from the depth of the eye-pits; for, it has been remarked, that horses begot by old stallions and old mares, have white hairs in the eye-brows at the age of nine or ten. The teeth of some horses are so hard, that they wear not by eating, and never lose the black mark. But these horses are easily known, because the cavities of their teeth are perfectly filled up, and their tushes are very long*. The age of a horse may likewise be known, though with less precision, by the bars or ridges of the palate, which are effaced in proportion as he advances in years.

At the age of two years, or two and a half, the horse is in a condition to propagate; and the mares, like most other females, are still sooner ripe for this operation. But the foals produced from such early embraces, are weakly,

or

* See l'Ecole de cavalerie de M. de la Gueriniere, p. 25.

or ill-formed. The horse should never be admitted to the mare till he is four or four and a half; and even this period is too early, excepting for coarse or draught-horses. When fine horses are wanted, the male should not be admitted to the mare before he is six years old; and Spanish stallions not till they be full seven. The mares may be one year younger: They generally come in season from the end of March to the end of June. But their chief ardour for the horse lasts not above 15 days or three weeks; and, during this critical period, the mare should be admitted to the stallion: He ought to be sound, vigorous, well-made, and of a good breed. To procure fine saddle-horses, foreign stallions, as Arabians, Turks, Barbs, and Andaloufians, are preferable to all others. Next to these, British stallions are the best; because they originally sprung from those above mentioned, and are very little degenerated. Italian stallions, especially those of Naples, are extremely good. With mares of a proper size, they produce excellent horses for the saddle; and, with strong large mares, they produce good coach-horses. It is alledged, that, in France, Britain, &c. the Arabian and Barbary stallions generally beget horses larger than themselves; and that those of Spain, on the contrary, produce a breed more diminutive. The best stallions for coach-horses are those of Naples, Denmark, Holstein, and Frielland. The stallions for saddle-horses should be * four feet

eight

* Fourteen hands and a half.

eight or ten inches, and five feet †, at least, for coach-horses. Neither ought the colour of stallions to be overlooked, as a fine black; gray, bay, sorrel, &c. All party-coloured, or ill defined colours, ought to be banished from the stud, as well as every horse which has white extremities. Besides these external qualities, a stallion should be endowed with courage, tractability, and spirit; he should have agility, a sensible mouth, and sure limbs; his shoulders should be perfectly free, and his haunches supple; he should have a spring and elasticity in his whole body, especially in his hind legs; and he ought to be trained and dressed in the riding-school. These precautions in the choice of a stallion are the more necessary, because it has been found by experience, that he communicates to his offspring almost all his good or bad qualities, whether natural or acquired. A horse naturally cross, skittish, restive, &c. produces foals of the same dispositions: And, as the defects of conformation and the vices of the humours are more certainly perpetuated than the qualities of the temper, one should reject from the stud every horse that is deformed or diseased, extremely vicious, glandered, broken-winded, frantic, &c.

In our climate, the mare contributes less to the beauty of her offspring than the stallion; but she contributes more, perhaps, to their stature and constitution. It is, therefore, of great im-
 VOL. III. U u portance,

† Fifteen hands.

portance; that mares for breed should be found, tall, large, and roomy in the trunk of the body, and good nurses. For elegant horses, Spanish and Italian mares are best; but, for draught-horses, those of Britain and Normandy are preferable. However, when the stallions are good, fine horses may be produced from mares of any country, provided they be well made and of a good breed; for, if the mares have sprung from a bad stallion, their offspring are generally defective. In horses, as in the human species, the young very frequently resemble either their male or female predecessors; only, it would appear, that, among the horse-kind, the female contributes less to the work of generation than in the human species. The son more frequently resembles his mother than the foal does the mare from which he is produced; and, when the foal happens to resemble his mother, the likeness is generally confined to the anterior parts of the body, as the head and neck.

To judge of the resemblance of children to their parents, the comparison ought not to be made till after the age of puberty. For, at this period, so many changes take place, that a person, with whom we were formerly familiar, we will hardly, at first sight, be able to distinguish. In the human species, the son, after puberty, often resembles the father, and the daughter the mother, and, not unfrequently, each retains a partial likeness to both parents; and this family-
likeness

Ekeness is generally recognisable in uncles, aunts, and in every ascending or descending branch. Among horses, as the male contributes more to the offspring than the female, mares very frequently produce foals which have a great resemblance to the stallion, or which always resemble the father more than the mother. And, even when the mare has been begot by a bad horse, it often happens, that, though served by a good stallion, and though handsome herself, her offspring, though beautiful and well made at first, gradually decline as they grow up; and other mares, sprung from a good race, produce foals, which, though they have an unpromising aspect when young, improve as they advance in years.

These facts, though they seem to concur in proving that the males have greater influence on the offspring than the females, appear not to be sufficient to render this point altogether unquestionable. It is by no means surprising, that stallions, which are always selected from a great number, generally imported from a warm climate, and fed and managed with the greatest care and circumspection, should prevail, in the business of generation, over common mares, bred in a cold country, and often subjected to hard labour. If mares were selected from warm climates, managed with equal attention, and served with the common stallions of our own country, I have not the smallest doubt, that, in this case,

case, the superiority of the females would be equally apparent as that of the males; and, in general, that, among horses, as well as the human species, the influence of both parents, when placed in equal circumstances, is nearly the same. What renders this opinion both more natural and more probable, is the well known fact, that, in studs, the number of females produced is equal to that of the males; which is a clear proof, that, with regard to sex at least, the female contributes her full proportion.

But, to return to our subject. When the stallion is chosen, and the mares are assembled, another stone-horse should be allowed to tease them, for no other purpose but to discover those which are in season. Those that are not in proper condition repel his attacks. But, instead of allowing him to proceed with the mares which are in season, he is led off, and the true stallion is substituted in his place. This trial is chiefly useful for discovering the condition of such mares as have never produced; for those which have produced are commonly in season nine days after their delivery, and may be safely covered on the tenth day. Nine days after, their condition may be tried by the above proof, and, if still in season, they should be covered a second time, and so on every ninth day, till their ardour abates, which happens a few days after conception. But, to conduct this matter properly, requires considerable attention and expence. The stud

stud should be established on good ground, and its dimensions proportioned to the quantity of mares and stallions employed. This ground should be divided into several apartments, and well fenced with ditches or hedges. The impregnated mares, and those which are suckling their young, should have the richest pasture. Another enclosure, where the grass is less rich, should contain the uncovered mares, those that have not conceived, and the female foals; for a rich pasture makes them grow too fat, and weakens the generative faculty. Lastly, the young male foals and geldings should be confined to the driest and most unequal part of the ground, that, by ascending and descending the eminences, they may acquire a freedom in their limbs and shoulders. This last enclosure should be well fenced from that which contains the mares, to prevent the young horses from enervating themselves by premature efforts. If the field be sufficiently extensive, each of these enclosures should be divided into two, and grazed alternately by horses and oxen. This mode of grazing improves the pasture; for the ox repairs what is injured by the horse. Each park should likewise be furnished with a pond, which is better than a running water, and also with trees to shelter the animals from too much heat; but, to prevent accidents, all old stumps should be rooted out, and deep holes filled up. These pastures will afford sufficient nourishment to the stud during

ring the summer ; but, in winter, the mares and foals should be put into stables, and fed with hay, excepting in very fine weather, when they may be set out to pasture during the day. The stallions should be always kept in the stables, fed with a greater proportion of straw than of hay, and moderately exercised till the time of covering, which generally lasts from the beginning of April till the end of June. During this period, they should be fed plentifully, but with nothing more than their ordinary food.

When the stallion is conducted to the mare, to augment his ardour, he should be well dressed. The mare should have the shoes taken off her hind feet ; for some of them are apt to kick at the approach of the stallion. One man holds the mare by the head, and two others lead the stallion by long reins. When in a proper situation, he should be assisted by the hand, and by turning aside the tail of the mare ; for the opposition of a single hair might wound him in a dangerous manner. The stallion sometimes quits the mare without consummating. If the trunk of his tail near the crupper vibrates before he descends, we may be certain that he has consummated ; for this motion always accompanies emission. After consummation, the act should not be reiterated ; but he ought to be carried back immediately to the stable, there to remain two days : For, though a horse might be able to cover every day during the season ; yet, if only
admitted

admitted once in two days, he is both more vigorous and more successful. During the first seven days, therefore, let him have four different mares, and, on the ninth, let him again cover the first mare, and so on as long as they continue in season. When one of the mares ceases to be ardent, another should be substituted in her place; and, as many are impregnated at the first, second, or third time, a stallion, managed in this manner, may cover 15 or 18 mares, and produce 10 or 12 foals, during the three months that these amours continue. Stallions throw out a vast profusion of seminal fluid; mares likewise emit, or rather distill, a fluid during the time they are in season; and, as soon as they are pregnant, these emissions cease. This fluid was called *Hippomanes* by the Greeks; and of it they are said to have made love-potions, which rendered horses, in particular, frantic with desire. The *Hippomanes* is totally different from the fluid found in the membranes that cover the foal, which was first discovered and described by M. Daubenton *. The appearance of the *hippomanes* is the most certain mark of ardour in mares. This passion may likewise be discovered by the swelling of the under part of the vulva, and by the frequent neighing of the mares, who, at this period, have a strong desire of approaching the horse. After a mare has been covered, she may be led to the pasture without

* Mem. de l'acad. des sciences, année 1751.

without any other precaution. The first foal is always more puny than the subsequent ones : To compensate this defect, a mare should be served, for the first time, with a large stallion. The differences in the figures of the horse and mare should be attended to, in order to correct the faults of the one by the perfections of the other ; and no disproportioned conjunctions ought to be admitted, as of a small horse and a large mare, or of a large horse and a small mare ; for the produce of such conjunctions will either be small or ill-proportioned. In order to improve nature, we must advance by gradual steps : A plump, but handsome horse, for example, may be admitted to a mare that is too gross, a small mare to a horse a little taller, a mare with a bad fore-hand to a horse with a fine head, neck, &c.

It has been remarked, that studs kept in dry light soils produce active, nimble, and vigorous horses, with nervous limbs and strong hoofs ; while those kept in moist ground, and in too rich pasturage, have generally large heavy heads, gross bodies, thick legs, bad hoofs, and broad feet. It is easy to perceive that these differences proceed from the varieties in climate and food. But the necessity of crossing the breed, to prevent the degeneration of horses, is more difficult to understand, and of more importance to be known.

There is in Nature a general prototype of every species, upon which each individual is modelled,

delled, but which seems, in its actual production, to be depraved or improved by circumstances; so that, with regard to certain qualities, there appears to be an unaccountable variation in the succession of individuals, and, at the same time, an admirable uniformity in the entire species. The first animal, the first horse, for example, has been the external and internal model, upon which all the horses that have existed, or shall exist, have been formed. But this model, of which we know only copies, has had, in communicating and multiplying its form, the power of adulterating or of improving itself. The original impression is preserved in each individual. But, among millions of individuals, not one exactly resembles another, nor, of course, the model from which they sprung. This difference, which shows that Nature is not absolute, but knows how to vary her works by infinite shades, is equally conspicuous in the human species, in all animals, and in all vegetables. What is singular, this model of the beautiful and the excellent, seems to be dispersed over every region of the earth, a portion of which resides in all climates, and always degenerates, unless united with another portion brought from a distance. In order, therefore, to obtain good grain, beautiful flowers, &c. the seeds must be changed, and never sown in the same soil that produced them. In the same manner, to have fine horses, dogs, &c. the males and females of different

countries must have reciprocal intercourse. Without this precaution, all grain, flowers, and animals degenerate, or rather receive an impression from the climate so strong as to deform and adulterate the species. This impression remains; but it is disfigured by every feature that is not essential. By mixing races, on the contrary, or by crossing the breed of different climates, beauty of form, and every other useful quality, are brought to perfection; Nature recovers her spring, and exhibits her best productions.

I mean not to enter into a detail of the causes of these effects; but shall confine myself to such conjectures as most readily present themselves. We know by experience, that animals or vegetables, transported from distant climates, often degenerate, and sometimes come to perfection, in a few generations. This effect, it is obvious, is produced by the difference of climate and of food. The operation of these two causes must, in process of time, render such animals exempt from, or susceptible of certain affections, or certain diseases. Their temperament must suffer a gradual change. Of course, their form, which partly depends on food and the qualities of the humours, must also, in the course of generations, suffer an alteration. This change, it is true, is hardly perceptible in the first generation; because the male and female, which we supposed to be the origin of this race, being fully grown, had received their form and structure before they

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were transported. The new climate and new food may change their temperament; but cannot have influence upon the solid and organic parts sufficient to alter their form. The first generation of these animals, therefore, will not suffer any change in their figure; nor, at the instant of birth, will the stock be vitiated or depraved. But the young and tender stranger will feel a much stronger impression from the climate than its father or mother experienced. The operation of food will likewise be so great as to influence the organic parts during the time of the animal's growth: A change will, of course, be introduced into its form; the seeds of imperfection will be sown, and appear, in a sensible manner, in the second generation, which will not only labour under its own proper defects, or those proceeding from its growth and nourishment, but inherit all the vices of the second stock. Lastly, the imperfections and deformities transmitted to the third generation, being combined with the influence of the climate and food during the growth of the animal, will become so great as to obliterate entirely the characters of the original stock. Hence, in a few generations, animals transported into a climate different from their own, lose all their distinctive qualities, and acquire those peculiar to the country they are obliged to inhabit. In France, Spanish or Barbary horses, when the breed is not crossed, become French horses sometimes in the second generation,

neration, and always in the third. Instead of preserving the breed distinct, therefore, it is necessary to cross it every generation, by admitting Spanish or Barbary horses to the mares of the country. It is singular, that this renewing of the race, which is only partial, produces better effects than if it were complete. A Spanish horse and mare will not produce such fine horses in France, as those bred from a Spanish horse and a French mare. This may easily be conceived, if we attend to the compensation of defects which necessarily happens, when males and females of different countries are allowed to intermix. Every climate, by its influence, joined to that of the food, gives a certain conformation of parts, which errs either by excess or defect. When a warm climate produces redundancies in particular parts, a cold climate gives rise to deficiencies in the same parts: Hence, when animals of opposite climates intermix, an exact compensation is effected. As the most perfect work of nature is that in which there are fewest defects, and as the most perfect forms are those which have fewest deformities, the production of two animals, whose faults exactly compensate each other, will be the most perfect of the kind. Now, this compensation being always completest, when animals of remote, or rather of opposite climates are joined, the compound resulting from the mixture is more or less perfect, in proportion as the excess or defects in the constitution of the

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the father are opposed to those peculiar to the mother.

To have good horses, therefore, in the temperate climate of France, stallions should be brought from the warmest or the coldest countries. The Arabian or Barbary horses ought to have the preference; and, after them, those of Spain and of Naples. With regard to cold climates, the horses of Denmark should be preferred, and, next to them, those of Holstein and Friesland. All these stallions, when admitted to French mares, will produce very fine horses; and they will always be better and more beautiful, in proportion as the climate is more remote from that of France; so that the Arabian horse is preferable to the Barb, and the Barb to the Spanish. In the same manner, stallions brought from Denmark will produce finer horses than those brought from Friesland. When stallions from very warm or very cold countries cannot be procured, they should be brought from England or Germany, or even from the southern provinces of France to the northern. Some advantage is always obtained by serving mares with strange horses; for, when those of the same race, and in the same stud, are allowed to intermix, they infallibly degenerate in a very short time.

The influence of climate and of food upon the human species, is not so great as upon other animals. The reason is obvious. Man defends himself better than any other animal from the intemperance

intemperance of the climate. He accommodates his lodging and his cloaths to the nature of the season. His food is more various, and, consequently, does not operate in the same manner upon every individual. The defects or redundancies which proceed from these two causes, and which are so constant and so perceptible in the animals, are by no means equally conspicuous in man. As migrations have often happened, as whole nations have intermixed, and as many men travel and disperse themselves through every quarter of the globe, it is not surprising that the human race are less subject to the influence of climate, and that strong, handsome, and even ingenious men, are to be found in every country. It is probable, however, that, from an experience, of which all remembrance is now lost, men had discovered the evils that result from alliances of the same blood; for, even among the most unpolished nations, a brother has rarely been permitted to marry his sister. This custom, which, among Christians, is a divine law, and which is observed by other people from political motives, may have originally been founded on observation. Policy, unless when derived from physical considerations, never extends in a manner so general and so absolute. But, if men once discovered by experience that their race degenerated, when intercourse was permitted among children of the same family, they would soon regard the alliances of different families,

families, as a law established by Nature. In a word, we may presume from analogy, that, in most climates, men, like other animals, would degenerate after a certain number of generations.

The variety in the colour of animals is another effect to be ascribed to the influence of climate and food. Wild animals which live in the same climate, are of the same colour, varying only in brightness or deepness, according to the seasons of the year. Those, on the contrary, which live under different climates, differ likewise in colour; and domestic animals are so prodigiously varied, that we have horses, dogs, cats, &c. of every kind of colour. But the stag, the hare, &c. are uniformly of the same colour. The injuries received from the climate, which are always the same, and the constant eating of the same food, produce this uniformity in the wild animals. The care of man, the luxury of shelter, and the variety of nourishment, efface and variegate the original colours in domestic animals. The mixture of foreign races, especially when the males and females are not of the same colour, produce the same effect, and sometimes give rise to beautiful varieties, as the pied horses, in which the white and black are often disposed in a manner so fanciful, as to seem to be rather the operation of art than of nature.

In coupling horses, regard should be had to the stature and the colour: The figures should be

be contrasted, and the breed crossed by stallions from the most opposite climates. Horses and mares brought up in the same stud should never be allowed to intermix. These are essential requisites. But there are other circumstances which ought not to be neglected. For example, in a stud, no mares, with short tails, should be kept; because, being unable to defend themselves from the flies, they are perpetually tormented. The continual agitation occasioned by the stinging of these insects, diminishes the quantity of milk, which has so great an influence on the constitution and stature of the foal, that its vigour is always proportioned to the goodness of its nurse. Brood-mares should be chosen from those which have been always pastured, and never fatigued with labour. Mares which have been long nourished in a stable with dry food, and afterwards turned out to grass, conceive not at first. Time is necessary to accustom them to this new kind of nourishment.

The common season of mares is from the beginning of April to the end of June; but the ardour of some not unfrequently appears at a more early period. An ardour so premature should be repressed; because the foal would be brought forth in cold weather, and, consequently, suffer both from the intemperance of the season, and from bad milk. If this ardour appears not till after the month of June, it should likewise be repressed; because the foal would be
produced

produced in summer, and would not acquire strength enough to resist the rigours of winter.

Instead of conducting the stallion to the mare, it is not uncommon to allow him to go loose in the parks where the mares are feeding, and to single out such as are in season. By this method the mares conceive more readily. But it injures the stallion more in six weeks, than he would be by six years exercise, moderated and conducted in the manner above directed.

When the impregnated mares begin to grow heavy, they should be separated from those which are not in that condition, to prevent them from receiving any injury. Their period of gestation is generally eleven months and some days. They bring forth in a standing posture, while almost all other quadrupeds lie down. When the delivery is difficult, they require the assistance of man; and, when the foal is dead, it is extracted with cords. As in most animals, the colt first presents its head. In escaping from the uterus, it breaks the membranes, and the waters flow abundantly. The waters are accompanied with several solid masses, formed by the sediment of the liquor of the allantoides. Those masses, called *hippomanes* by the antients, are not, as they supposed, pieces of flesh attached to the head of the foal. They are, on the contrary, separated from the foal by the *amnios*. Immediately after birth, the mare licks the foal: But she never touches

the *hippomane*s, though the antients assert that she instantly devours it.

It is usual to cover a mare nine days after she has foaled, that no time may be lost, and that every possible profit may be derived from the stud. It is certain, however, that her strength being divided, she is unable to nourish both a foal and a foetus so successfully as if she had but one at a time. To procure excellent horses, therefore, the mares should be covered but once in two years, which would make them live longer, and hold more surely; for, in ordinary studs, it is well if a half or two thirds bring forth in a year.

Mares, though impregnated, can suffer to be covered; and yet there are no instances of superfoetation. In general, they are capable of producing to the age of 14 or 15 years, and the most vigorous produce not after 18. Stallions, when properly managed, retain their prolific powers to the age of 20 years, and sometimes longer: And, as in man, those which began too early are soonest extinguished; for the large horses, which come sooner to maturity than fine ones, and are employed as stallions at the age of four years, are commonly useless at 15.

The life of horses, as in every other species of animals, is proportioned to the time of their growth. Man, who grows 14 years, can live six or seven times as long, i. e. 90 or 100. The horse, whose growth is accomplished in four years,

years, can live six or seven times as much, i. e. 25 or 30. The exceptions to this rule are so few, that no conclusions can be drawn from them: And, as the large horses come sooner to maturity than the delicate ones, their lives are likewise shorter, and they are superannuated in 15 years.

In horses, and most other quadrupeds, the growth of the posterior parts seems at first to be greater than that of the anterior. But, in man, the growth of the inferior parts is at first less than that of the superior: For the thighs and legs of infants are, in proportion to their bodies, much less than those of adults. The hinder legs of the foal, on the contrary, are so long that they can reach his head, which is by no means the case after he acquires his full growth. But this difference proceeds not so much from the inequality in the total growth of the anterior and posterior parts, as from the unequal lengths of the fore and hind feet, which uniformly holds through all nature, and is most remarkable in quadrupeds. Man's feet are larger, and likewise sooner formed, than his hands. The greatest part of the horse's hind leg is only a foot, being composed of bones corresponding to the tarsus, metatarsus, &c. It is not, therefore, surprising, that this foot should be sooner expanded than the fore-leg, the inferior part of which represents the hand, being composed of the bones of the carpus, metacarpus, &c. This difference

is easily perceived immediately after a foal is brought forth. The fore-legs, when compared with the hind ones, are proportionably much shorter than they are to be afterwards. Besides, the thickness which the body acquires, though independent of the proportional growth in length, increases the distance between the hind-feet and the head, and, consequently, prevents the animal, when full grown, from reaching it.

In all animals, each species varies according to the climates; and the general results of these varieties constitute different races. Of these we can only distinguish the most remarkable, or those that sensibly differ from each other, passing over the intermediate shades, which here, as in all the operations of nature, are infinite. We have even augmented their number and confusion by cherishing the mixture of races. If the expression may be used, we have dealt roughly with nature by bringing into our climates the horses of Asia and of Africa. By introducing into France the horses of every country, the primitive race cannot now be recognised; so that, to distinguish horses, there remains only a few slight characters produced by the actual influence of the climate. These characters would be still better marked, and the differences more sensible, if the races of each climate were preserved without mixture. These small varieties would be more apparent, and less numerous.

But

But there would be a certain number of great varieties, which every man could distinguish with ease. Instead of which, habit, and even long experience, are necessary to enable us to know the horses of different countries. On this subject we have no light but what is derived from the books of travellers, the works of Newcastle, Garfaut, Guerinere, &c. and some remarks communicated to us by M. de Pignerolles, master of horse to the King of France, and president of the academy of Angers.

The Arabian horses are the most beautiful. They are larger, more fleshy, and handsomer than the Barbs. But, as they are seldom brought into France, few observations have been made with regard to their perfections or defects.

Barbary horses are more common. They have a long, fine neck, not overcharged with hair, and well divided from the withers. The head is small and beautiful. The ears are handsome and properly placed. The shoulders are light and flat. The withers are thin and well raised. The back is straight and short. The flank and sides are round, and the belly not too large. The haunch-bones are properly concealed; the crupper is somewhat long, and the tail placed rather high. The thigh is well formed, and rarely flat. The limbs are fine, handsome, and not hairy. The tendon is prominent, and the foot well made; but the pastern is often long. They are of all colours, but generally grayish. In their movements, they

This is perhaps, not a bad description, although it is

are apt to be careless, and require to be checked. They are swift, nervous, light, and make extremely fine hunters. These horses appear to be the most proper for improving the breed. Their stature, however, is not so large as could be wished. They are seldom above four feet eight inches*, and never exceed four feet nine. It is confirmed by repeated experience, that, in France, England, &c. they produce foals which grow larger than their parents. Of the Barbary horses, those of the kingdom of Morocco are said to be the best, and next to these are the Barbs from the mountains. The horses of Mauritania are of an inferior quality, as well as those of Turkey, Persia, and Armenia. All the horses of warm climates have smoother and shorter hair than those of other countries. The Turkish horses are not so well proportioned as the Barbs. Their necks are generally slender, their bodies long, and their legs too thin. They are, however, excellent travellers, and have a long wind. It will not be thought surprising, that the bones of animals are harder in warm than in cold climates. It is for this reason, that, though they have thinner shank bones than the horses of this country, their limbs are stronger.

The Spanish horses, which hold the second rank after the Barbs, have a long, thick, hairy neck. The head is rather gross and fleshy. The ears are long,

* Fourteen hands and a half.

long, but well situated. The eyes are full of fire, and their air is bold and noble. The shoulders are thick and the chest broad. The reins are often a little low, the sides round, and the belly frequently too big. The crupper is generally round and large, though in some it is somewhat long. The limbs are fine and not hairy; the tendons in the legs are prominent; the pastern is sometimes too long, like that of the Barb; the foot is rather long, like that of the mule; and the heel is often too high. The Spanish horses of the best race are thick, plump, and of a low stature. Their movements are likewise quick and supple; and they are remarkable for spirit and boldness. Their colour is commonly black, or a dark chestnut, though they are to be found of all colours. Their noses and limbs are seldom white. These marks are disliked by the Spaniards, who never breed from those which have them. Their favourite mark is a star in the fore-head; and they esteem a horse without a single spot, as much as we despise him. Both of these prejudices, though opposite to each other, are perhaps equally ill founded; for we find excellent horses with all kinds of marks, or with no marks whatever. These little differences in the coats of horses, seem to have no dependence on their dispositions or internal constitution; but take their rise from external circumstances; for a slight wound

* This is, perhaps, not altogether true; for, it is generally remarked,

wound on the skin produces a white spot. Besides, Spanish horses, of whatever kind, are all marked in the thigh, with the mark of the stud from which they were taken. They are generally of a small stature, though some of them are four feet nine or ten inches*. Those of Upper Andalusia are said to be the best, though their heads be often too long. But their other rare and excellent qualities make this fault be overlooked. They are obedient, courageous, graceful, spirited, and more docile than the Barbs. For those talents they are preferred to all the horses of the world, for the purposes of war, of pomp, or of the manege.

The finest English horses, in their conformation, resemble those of Arabia and Barbary, from which they originally sprung. Their heads, however, are too large, though handsome; and their ears are too long, but well situated. By the ears alone, an English horse may be distinguished from a Barb. But the great difference lies in their stature; for the English horses are much larger and plumper, being commonly four feet ten, and even five feet high†. They are of all colours, and distinguished by every sort of mark.

It is remarked, that white or light coloured animals are not so strong and hardy as those of darker colours. It is found by experience, that those legs of horses which have much white upon them, are aptest to swell and turn greasy; and the white spots occasioned by wounds seem to indicate a particular weakness in the parts.

* Fourteen hands and a half. † 15 hands high.

mark. They are generally strong, vigorous, hardy, capable of enduring much fatigue, and excellent either for hunting or the course. But they want grace and docility; they are stiff, and have little play in their shoulders.

The English race-horses are extremely fleet, and are managed with great dexterity by their riders. I cannot give a better example than by relating the substance of a letter I received from a respectable nobleman *, dated *London, 18. Feb. 1748.* Mr Thornhill, post-master of Stilton, laid a bet, that he would ride three times the road from Stilton to London, or 215 English miles, in 15 hours. He set out from Stilton on the 29th day of April 1745, and, after mounting eight different horses on the road, arrived at London in three hours fifty-one minutes. He instantly set off from London, and, having mounted only six horses, he reached Stilton in three hours fifty-two minutes. For the third course, he used seven of the same horses, and finished it in three hours forty-nine minutes. So that he not only gained his bet, but, instead of fifteen hours, he had performed what he had undertaken in eleven hours thirty-two minutes. I suspect that no example of such fleetness was ever exhibited at the Olympic games.

The Italian horses were formerly much handsomer than they are now; because, for some time past, the breed has been neglected. However, the Neapolitan horses are still excellent for

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carriages.

* The Earl of Morton.

carriages. But, in general, they have large heads and thick necks; they are also untractable, and, of course, not easily managed. These defects are compensated by the stateliness of their form, by their high spirit, and by the gracefulness of their motions.

The Danish horses, both on account of size and beauty, are preferred to all others for carriages. Some of them are perfect models; but their number is small: For most of them are not very regularly formed, having thick necks, gross shoulders, backs too long and too low, and cruppers too narrow in proportion to the thickness of their fore-parts. But they are all graceful in their movements; and, in general, they are excellent for war and for pomp. They are of all colours; and the tiger-spotted horses are peculiar to Denmark.

Germany produces very fine horses: But, though generally bred from Barbary, Turkish, Spanish, and Italian horses, most of them are heavy and short-winded; and therefore ill qualified for hunting or coursing. The horses of Hungary and Transylvania, on the contrary, are light and nimble. To prevent their neighing in time of war, and also, it is said, to improve their wind, the Hungarians slit the nostrils of their horses. I have never had an opportunity of ascertaining the fact, that horses, whose nostrils are slit, lose the power of neighing. But I should rather imagine, that this operation only renders

renders their neighing more feeble. It is remarked of the Hungarian, Croatian, and Polish horses, that they are noted for retaining what is called the *mark* in their teeth till they be very old.

The Dutch horses answer very well for drawing coaches, and are commonly used in France for that purpose. The best kind are brought from the province of Friesland: Those of Bergue and Juliers are also very good. The Flemish horses are much inferior to the Dutch. Almost the whole of them have large heads, and broad feet; and their legs are subject to humours. These two last faults render them very unfit for carriages.

In France there are horses of all kinds; but few of them are handsome. The best saddle-horses are brought from the Limosin. They resemble the Barbs, and are excellent for the chace. But they grow very slowly, require much care when young, and must not be used till they arrive at the age of eight years. There are likewise good ponies in Auvergne, Poitou, and Burgundy. But, next to the Limosin, Normandy furnishes the finest horses. They are not so good for the chace; but they make better war-horses. They are plump, and soon acquire their full growth. Good coach-horses, lighter and more alert than those of Holland, are bred in Lower Normandy and Cotentin. Franche-Comté and the Boulonnois furnish us
with

with very good draught-horses. In general, the French horses have their shoulders too wide, while those of the Barb are too narrow.

Having described those horses with which we are best acquainted, we shall now give the relations of travellers concerning foreign horses, of which we have little knowledge. There are good horses in all the islands of the Archipelago. Among the antients, the horses of Crete were in high estimation for agility and swiftness*. However, horses are now little used in that island, on account of the ruggedness of the country, which is every where mountainous, and full of inequalities. The best horses in these islands, and even in Barbary, are of the Arabian race. The native horses of the kingdom of Morocco are much smaller than those of Arabia, but very nimble and vigorous†. Mr Shaw alleges‡, that the breed of Egypt and of Tingitania is superior to those of the neighbouring countries; and yet, more than a century ago, excellent horses were found throughout all Barbary. These Barbary horses, he says, never stumble; and they stand still when the rider dismounts, or drops the bridle. They walk very fast, and gallop with great rapidity; but they are never allowed to trot or amble, these movements being considered by the natives as rude and

* Descrip. des îles de l'Archipel, par Dapper, p. 402.

† L'Afrique de Marmol, tom. 2. p. 124.

‡ See Shaw's travels.

and vulgar. He adds, that the Egyptian horses are superior to all others both in stature and in beauty. But these Egyptian, as well as most of the horses of Barbary, sprung originally from the Arabians, which are unquestionably the handsomest horses in the world.

According to Marmol *, or rather Leo Africanus †, whom Marmol has copied almost verbatim, the Arabian horses are descended from the wild horses in the deserts of Arabia, of which studs were formed very antiently, and which multiplied so greatly, as to spread over all Asia and Africa. They are so swift as to out-run the ostrich. The Arabs of the desert and the people of Lybia rear numbers of these horses for the chase. They never use them either in war, or for travelling. They pasture them as long as the grass remains, and, when it fails, they feed them with dates and camel's milk, which make them nervous, light, and meagre. They catch the wild horses in snares, and, when young, they eat their flesh, which they esteem to be very delicate. These wild horses are small, and commonly of an ash-colour, though some of them are white; and the hair of the mane and tail is short and crisped. Curious relations, concerning the Arabian horses, are given by other travellers ‡, of which I shall only mention some of the principal facts.

There

* L'Afrique de Marmol, tom. 1. p. 50.

† Leo. Afric. de Africae descript. tom. 2. p. 750.

‡ Voyage de M. de la Roque, p. 194, et l'hist. generale des voyages, tom. 2. p. 626.

There is not an Arabian, however poor, who has not his horses. They generally ride upon mares, having learned from experience, that mares endure fatigue, hunger, and thirst, better than horses. These mares are so gentle, that, though numbers of them are often left together for whole days, they never strike or do each other the smallest injury. The Turks, on the contrary, are not fond of mares; but they purchase from the Arabs those horses which they intend not to use as stallions. The Arabs preserve with great care, and for an amazing length of time, the races of their horses. They know all their alliances and genealogies*; and they distinguish

* The reader is here presented with an original attestation, some of which, M. D'Arvieux says, have been preserved for above 500 years in the public records.

Taken before ABDORRAMAN, KADI of ACCA.

The occasion of this present writing or instrument is, that, at Acca, in the house of Badi, legal established judge, appeared in Court Thomas Usgate the English consul, and with him Sheikh Morad Ebn al Hajj Abdollah, Sheikh of the county of Safad; and the said consul desired, from the aforesaid Sheikh, proof of the race of the gray horse which he bought of him, and he affirmed to be Monaki Shaduhi*; but he was not satisfied with this, but desired the testimony of the Arabs, who bred the horse, and knew how he came to Sheikh Morad; whereupon there appeared certain Arabs of repute, whose names are undermentioned, who testified and declared, that the gray horse which the consul formerly bought of Sheikh Morad, is Monaki Shaduhi,

of

* These are the names of the two breeds of Arab horses, which are reckoned pure and true, and those which are of both these breeds by father and mother, are the most noble and free from bastardy.

stinguish their races into three different classes. The first, which are of a pure and antient race on both sides, they call Nobles; the second are likewise of an antient race, but have been degraded by vulgar alliances; and the third class consists of their common horses. The latter sell at a low price. But those of the first class, and even of the second, among which some individuals are not inferior to the nobles, are excessively dear. Mares of the noble class are never permitted to be covered but by horses of the same quality. The Arabs, by long experience, know all the races of their horses, as well as those of their neighbours. They know their names,

of the pure race of horses, purer than milk †; and that the beginning of the affair was, that Sheikh Saleh, Sheikh of Alfabal, bought him of the Arabs, of the tribe of al Mohammadat, and Sheikh Saleh sold him to Sheikh Morad Ebn al Hajj Abdollah, Sheikh of Safad, and Sheikh Morad sold him to the consul aforesaid; when these matters appeared to us, and the contents were known, the said gentleman desired a certificate thereof, and testimony of the witnesses, whereupon we wrote him this certificate, for him to keep as a proof thereof. Dated Friday 28 of the latter Rabi in the year 1135.

Witnesses,

*Sheikh Jumat al Faliban of the Arabs
of al Mohammadat.*

Ali Ebn Taleb al Kaabi.

Ibrahim his Brother.

*Mohammed al Adhra Sheikh Alfarifat.
Khamis al Kaabi.*

† A proverbial expression.

names, surnames, colours, peculiar marks, &c. When a family have no noble stallions, they borrow one of a neighbour to cover their mares, which is performed in presence of witnesses, who give an attestation of it, signed and sealed, before the secretary of the Emir, or some other public person. This attestation contains the names of the horse and mare, and a complete history of their pedigrees. When the mare has foaled, witnesses are again called, and another attestation is made, including a description of the foal, and the day of its birth. These attestations enhance the value of their horses, and they are always delivered to the purchasers. The smallest mares of this first class are worth 500 crowns; and many of them sell at a 1000 crowns; and even higher prices are sometimes given. As the Arabs live in tents, these tents serve them likewise for stables. The mare and her foal, the husband and his wife and children, sleep together promiscuously. The infants often lie on the body, or on the neck of the mare or foal, without receiving any injury from these animals, which seem afraid to move, for fear of hurting them. These mares are so accustomed to society, that they submit to every kind of familiarity. The Arabs never beat their mares; but treat them gently, and talk and reason with them. They are so careful of them as to allow them always to walk, and never spur them, unless the occasion be very urgent. Hence, when-

ever

ever the creatures perceive the rider's heel make an approach to their sides, they instantly set off with incredible swiftness, and leap hedges and ditches as nimbly as stags. If their riders chances to fall, they are so well trained, that they stop short, even in the most rapid gallop. All the Arabian horses are of a middle stature, very easy in their carriage, and rather meagre than fat. They are dressed every morning and evening with so much care, that not a spot of dirt is left on their skin, and their legs, mane, and tail, are washed. Their tails are allowed to grow long; and the comb is seldom used, to prevent the hair from being broken. During the day, they are not permitted to eat; but are watered twice or thrice. At sun-set, a bag, containing about half a bushel of barley, is passed over their heads, and fastened to the neck. This bag is not removed till next morning, when the barley is entirely consumed. In the month of March, when the grass is good, they are turned out to pasture. This is also the season in which the mares are covered; and, on these occasions, water is employed in the same manner as in other countries. After the spring is past, the horses are taken from the pasture; and, during the rest of the year, they are allowed neither grass nor hay, and rarely straw, barley being their only food. At the age of a year or ten months, the Arabians cut the manes of their foals, with a view to make them grow long and bushy.

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busby. When two years, or two years and a half old, they are mounted, having never, before that period, been either saddled or bridled. Every day, from morning to night, all the Arabian horses stand saddled at the tent-doors.

This race of horses is spread over all Barbary; and the great men among the Moors, and even among the Negroes along the Gambia and Senegal, have Arabian horses of great beauty. Instead of barley or oats, they are fed with maize, reduced to a powder, which is mixed with milk, when they require to be fattened. In this warm climate, they are allowed little water*. On the other hand, the Arabian horses are dispersed over Egypt, Turkey, and, perhaps, Persia, where very considerable studs were formerly kept. Marc Paul† mentions one of these studs which contained ten thousand white mares; and he says, that, in the Province of Balaschia, there is a vast number of large nimble horses, with hoofs so hard as to require no shoes.

The Levant horses, like those of Persia and Arabia, have very hard hoofs: They are shod, however; but with shoes extremely light and thin. In Turkey, Persia, and Arabia, the same manner of feeding and dressing horses is observed. Their litter is made of their own dung, which is first dried in the sun, to remove the

* L'Hist. generale des voyages, tom. 3. p. 297.

† La descript. geog. de l'Inde, par Marc Paul, tom. 1. p. 41. et liv. 1. p. 21.

the disagreeable smell, and then reduced into a powder. Of this a bed is laid in the stable or tent, about four or five inches thick. This litter lasts very long; for, after being soiled, it is dried a second time in the sun, which clears it entirely from its offensive odour.

In Turkey there are Arabian, Tartarian, and Hungarian horses, beside the native horses of that country, which last are exceedingly handsome*, swift, and spirited. But they are delicate, and soon fatigued. They eat little, are easily heated, and their skin is so sensible, that they are unable to bear the friction of a comb; in place of which, they are brushed, and washed with water. These horses, though beautiful, are inferior to the Arabians; and even to those of Persia; the latter, next to the Arabians†, being the handsomest and best horses of the East. The pasture in the plains of Media, of Persepolis, of Ardebil, and of Derbent, is extremely fine; and a prodigious quantity of horses, most of which are beautiful and excellent, are raised there by order of government. Pietro della Valle‡ prefers the common horses of Persia to the finest Neapolitan horses. They are generally of a middle stature||; and some of them are very small, but strong

* Le Voyage de M. Dumont, tom. 3. p. 253.

† Les Voyages de Thevenot, tom. 2. p. 220. de Chardin, tom. 2. p. 25; d'Adam Olearius, tom. 1. p. 560.

‡ Les Voyages de Pietro della Valle, tom. 3. p. 284.

|| Voyages de Tavernier, tom. 2. p. 191. q. 1.

strong and active *; while others exceed the size of the English saddle-horses †. They have light heads, and fine necks. Their ears are handsome and well situated. They have slender legs, fine cruppers, and hard hoofs. They are docile, spirited, bold, and capable of enduring great fatigue. They are extremely swift, and never stumble. They are robust, and so easily nourished, that their only food is barley mixed with cut straw; and they are grazed during six weeks of the spring only. Their tails are allowed to grow long; and they are never gelded. Coverings are used to defend them from the injuries of the weather. Peculiar care and attention are bestowed upon them; and they are managed by a simple bridle, without employing the spur. Great numbers of them are transported to Turkey and the Indies. Those travellers, who bestow so much praise upon the Persian horses, allow, however, that the Arabians are superior in agility, courage, strength, and beauty; and that they are more valued, even in Persia, than the horses of that country. The horses which are bred in the Indies are very indifferent ‡. Those used by the great men of the country are brought from Persia and Arabia.

* Les Voyages de Thevenot, tom. 2. p. 220.

† Les Voyages de Chardin, tom. 2. p. 25.

‡ Le Voyage de la Boullaye-le-Gouz, p. 256. et Recueil des voyages qui ont servi à l'établissement de la compagnie des Indes, tom. 4. p. 424.

rabia. They are fed with hay during the day; and, at night, in place of barley and oats, they get pease boiled with sugar and butter. This nourishing diet supports them, and gives them some degree of strength; without it, they would soon perish, the climate not being adapted to their constitution. The native horses of India are very small. Some of them are so exceedingly diminutive, that Tavernier informs us, the young Prince of Mogul, aged about seven or eight years, generally rode on a handsome little creature, whose stature exceeded not that of a large grayhound*. Very warm climates, it would appear, are destructive to horses. Those of the Gold Coast, of Juida, of Guiney, &c. are likewise extremely bad. They carry their head and neck very low. Their movements are so feeble and tottering, that one is apt to imagine they are always ready to fall. If not continually beat, they would not stir a limb; and the greatest part of them are so short, that the feet of the rider almost touch the ground†. They are, besides, very untractable, and fit only to be eaten by the Negroes, who are equally fond of horses flesh as that of dogs‡. This appetite for horses flesh is common to the Negroes and Arabians, and discovers itself in Tartary, and even in

* Les Voyages de Tavernier, tom. 3. p. 334.

† Hist. generale des voyages, tom. 3. p. 228.

‡ Idem, tom. 4. p. 353.

in China*. The Chinese horses are as bad as those of India, being feeble, ragged, ill made, and very small†: Those of Corea exceed not three feet in height‡. Almost all the horses of China are gelded; and they are so timid, that they cannot be used in war. It may, indeed, be affirmed, that the Tartarian horses made the conquest of China. The horses of Tartary are very proper for the purposes of war. Though not of the largest size, they are strong, vigorous, bold, fiery, and extremely swift. Their hoofs are hard, but too narrow; their heads are light, but too small; their necks are long and stiff; and their limbs are too long. Notwithstanding these faults, they may be regarded as good horses; for they are indefatigable, and run with amazing rapidity. The Tartars, like the Arabians, live with their horses. At the age of seven or eight months, they are mounted by children, who walk and gallop them by turns. In this manner they are gradually trained; and they are accustomed to suffer long abstinence. But they are not mounted for hunting or travelling, till they arrive at six or seven years of age, when they are

* *Le Voyage de M. le Gentil*, tom. 2. p. 24.

† *Les anciennes relations des Indes, & de la Chine, traduites de l'Arabe*, p. 204. *L'Hist. gen. des voyages*, tom. 6. p. 492. 535. *L'Histoire de la conquête de la Chine, par Palafox*, p. 426.

‡ Nine hands.

obliged to undergo the most incredible fatigues*; as walking two or three days without stopping; receiving, for four or five days on end, only a handful of herbage every eight hours; and, at the same time, kept from drinking for 24 hours, &c. These horses, which are so robust in their own country, become feeble and useless when transported to China or the Indies: But they thrive very well in Persia and Turkey. In Little Tartary, there is a race of small horses, of which the natives are so fond, that they never permit them to be sold to strangers. They possess all the good and bad qualities peculiar to the horses of Great Tartary; which demonstrates, that the influence of the same manners and education create, in these animals, the same dispositions and temperament. In Circassia and Mingrelia, there are many horses still handsomer than those of Tartary. Fine horses are also to be found in the Ukraine, in Walachia, in Poland, and in Sweden. But we have no particular information concerning their excellencies or defects.

If we consult the antients as to the qualities of horses in different countries, we shall find †, that the Greek horses, and especially those of Thessaly and Epirus, were in high estimation, and were excellent for the purposes of war; that

* Palafox, p. 427. Le recueil des voyages du Nord. tom. 3. p. 156. Tavernier, tom. 1. p. 472. L'Hist. gen. des voyag. tom. 6. p. 603. et tom. 7. p. 214.

† Aldrovand. hist. nat. de soliped. p. 48. &c.

that those of Achaia were the largest then known; that the handsomest came from Egypt, where they were very numerous, and where Solomon sent to purchase them at a very high price; that, in Ethiopia, on account of the great heat of the climate, the horses did not thrive; that Arabia and Africa furnished the handsomest, lightest, and best horses, either for travelling or for the course; that those of Italy, and particularly, of Apulia, were likewise very good; that Sicily, Cappadocia, Syria, Armenia, Media, and Persia, produced excellent horses, which were remarkable for lightness and fleetness; that those of Sardinia and Corsica were small, but bold and vivacious; that the horses of Spain resembled those of Parthia, and excelled in war; that, in Transylvania and Walachia, there were swift horses, with light heads, long manes which hang down to the ground, and bushy tails; that the Danish horses were handsome, and fine leapers; that those of Scandinavia were small, but well-formed, and very agile; that the horses of Flanders were remarkable for strength; that the Gauls furnished the Romans with good horses for the purposes of riding and carrying burdens; that the German horses were ill-formed, and so vicious, that no use was made of them; that the horses of Switzerland were numerous, and good for war; that those of Hungary were also very good; and, lastly, that the Indian horses were small and very feeble.

From

From all these facts, it is apparent, that the Arabian horses have always been, and still are, the best horses of the world, both for beauty and goodness; that from them, either directly, or by the mediation of the Barbs, are derived the finest horses in Europe, in Africa, and in Asia; that Arabia is, perhaps, not only the original climate of horses, but the best suited to their constitution; since, instead of crossing the breed by foreign horses, the natives anxiously preserve the purity of their own race; that, at least, if Arabia be not the best climate for horses, the Arabs have produced the same effect, by the scrupulous and perpetual attention they have paid towards ennobling the race, and never permitting individuals to mix which were not the most handsome, and of the finest quality; and that, by the same attention, continued for ages, they have improved the species far beyond what Nature would have performed in the most favourable climate. It may still farther be concluded, that climates rather warm than cold, and above all, dry countries, are best adapted to the nature of horses; that, in general, the small are better than the large horses; that care is equally necessary to them as food; that, by familiarity and caresses, we procure more advantage from them, than by force and chastisement; that the horses of warm countries have their bones, hoofs, and muscles, more firm and compact than those of our climates; that, though heat is more con-

formable to the nature of these animals than cold, yet excessive heat is exceedingly hurtful to them; that excessive cold is not less injurious; and, in fine, that their constitution and dispositions depend almost entirely upon climate, food, care, and education.

The practice of gelding horses, so generally diffused over Europe and China, is unknown in Persia, Arabia, and many other parts of the east. This operation greatly diminishes their strength, courage, sprightliness, &c.; but it endows them with gentleness, tranquility, and docility. In performing it, the animal is thrown on his back, by means of ropes fixed to his legs; the scrotum is opened with a sharp knife; and the testes, with their vessels, and the ligaments which support them, are removed. The wound is then closed up; and the patient is bathed twice a day with cold water. His food, during this period, consists of bran drenched in water, with a view to cool him. The operation should be performed in spring or autumn, much heat, or much cold, being equally dangerous. With regard to the age at which it should be executed, the practice differs in different places. In certain provinces of France, horses are gelded at the age of a year or eighteen months, or as soon as the testes are very apparent without the body. But the most general and most rational custom is to delay the operation till the age of two or three years; because, when protracted this long, the animal

animal retains more of the qualities peculiar to the male sex. Pliny says, that, if a horse be gelded before he loses his milk-teeth, they never shed. But I know, from repeated observation, that this remark is false. The ancients, it is probable, were led into this error, by an analogy drawn from the stag, roe-buck, &c.; for the horns of these animals never fall off after castration. Geldings lose the power of impregnating; but there are many examples of their being still able to copulate.

Horses of all colours, like most animals covered with hair, moult or cast their hair every year, commonly in the spring, and sometimes in autumn. As they are then weaker than at any other period, they require more care, and should be more plentifully fed. Some horses likewise cast their hoofs, especially in moist and marshy countries, as in Holland*.

Mares and geldings neigh less frequently than perfect horses. Their voices are also neither so full nor so deep. In horses of every kind, five different species of neighing, expressive of different passions, may be distinguished. In the neigh proceeding from joy, the voice is long protracted, and begins and terminates with sharp sounds: The horse, at the same time, flings, but without any inclination to strike. In the
neigh

* If this assertion be true, the casting of the hoofs must proceed from some morbid cause; for no horses cast their hoofs, unless when diseased.

neigh of desire, whether from love or friendship, the horse does not fling, the voice is long continued, and finishes with graver sounds. The neigh of anger, during which the animal flings and strikes with fury, is very short and sharp. The neigh of fear, during which he also flings, is not longer than that of anger; the voice is grave and hoarse, and seems as if it proceeded entirely from the nostrils. This neigh resembles the roaring of a lion. The noise expressive of pain is not so much a neigh, as a groan or snorting uttered with a grave voice, and following the alternate motions of respiration. It has likewise been remarked, that horses which neigh most frequently from motives of joy or desire, are the best and most generous. The voice of unmutilated horses is stronger than that of geldings or mares. The female voice, even from the moment of birth, is weaker than that of the male. At two years, or two and a half, which is the age of puberty, the voice both of males and females, as in man and other animals, becomes stronger and more grave.

When the horse is fired with love, he shows his teeth, and has the appearance of laughing. He likewise shows them when angry and inclined to bite. He sometimes thrusts out his tongue to lick, but less frequently than the ox, though the latter is less sensible of caresses. The horse remembers injuries much longer than the ox, and is also more easily dispirited. His natural

tural disposition, which is bold and impetuous, makes him exert his whole force at once; and, when he perceives that still more is requisite, he grows indignant, and obstinately refuses to act. But the ox, who is naturally slow and slothful, seldom employs his whole strength, and is not so easily disheartened.

The horse sleeps much less than man. When in good health, he never lies above two or three hours at a time. He then rises to eat. After being much fatigued, and after filling his belly, he lies down a second time. But, upon the whole, he sleeps not above three or four hours in the twenty-four. There are also some horses which never lie down, but sleep standing; and even those which are accustomed to lie down, sometimes sleep on their feet. It has been remarked, that geldings sleep oftener and longer than perfect horses.

All quadrupeds drink not in the same manner, though all are under an equal necessity of exploring with the head that liquor which they have no other method of apprehending, excepting the monkey, and some other animals that have hands, and can drink like man, when a proper vessel is presented to them; for they carry it to their mouth, pour out the liquor, and swallow it by the simple movement of deglutition. This is the ordinary way in which man drinks, because it is the most commodious. But he can vary his method of drinking, by contracting the

the lips, and sucking the fluid, or rather by sinking both mouth and nose into it, and then performing the motions necessary to swallowing. He can even seize a fluid by the simple motion of his lips; or, lastly, he can stretch out and expand his tongue, make a kind of little cup of it, and, in this manner, though with some difficulty, satisfy his thirst. Most quadrupeds might also drink in different ways: But, like man, they follow that which is most convenient. The dog, whose mouth opens wide, and whose tongue is long and slender, drinks by lapping, or licking, with his tongue, which he forms into a kind of cup or scoop, fills at each time, and thus carries a sufficient quantity of fluid into his mouth. This method he prefers to that of dipping his nose into the water. The horse, on the contrary, whose mouth is too small, and whose tongue is too thick and too short, for forming a scoop, and who, besides, drinks with more avidity than he eats, briskly sinks his mouth and nose deep into the water, which he swallows plentifully by the simple motion of deglutition *. But this obliges him to drink without drawing his breath; while the dog respire at his nose during the time he is drinking. After running, when the respiration is short and laborious, horses should be

* This is not always the case; for many horses touch only the surface of the water with their lips, and suck it gently in; and even those which dip their noses deeper, never sink the nostrils under the water, but breathe freely through them when drinking.

be allowed to drink at leisure, and to breathe as often as they incline. Neither should they be permitted to drink water that is too cold; for, independent of the colics frequently occasioned by very cold water, it often cools their nose to such a degree, as brings on rheums, and perhaps lays the foundation of the disease called *glanders*, the most obstinate of all maladies to which this noble animal is subject. It has lately been discovered, that this disease is seated in the pituitary membrane*; and that it is a genuine rheum, which in time produces an inflammation in that membrane. Besides, those travellers who give a detail of the diseases of horses in warm countries, alledge not that the glanders is equally frequent in Arabia, Persia, and Barbary, as in cold climates. Hence I am led to conjecture, that this malady is owing to the superior coldness of the water; because these animals are obliged to keep their noses in the water a considerable time, which might be prevented by never allowing them to drink very cold water, and by always drying their nostrils after drinking. Asses, which dread cold more than horses, and resemble them so greatly in their internal structure, are not equally subject to the glanders, which is owing, perhaps, to their drinking in a different manner from the horse; for, instead of sinking the nose into the water, they barely touch it with their lips.

I

* M. de la Fosse, fermier to the King, first demonstrated this fact; and he has attempted to cure horses by the trepan.

I shall mention no more of the diseases of horses. It would extend Natural History beyond all bounds, if, to the history of each animal, we were to join that of its diseases. However, I cannot finish the history of the horse, without regretting that the health of this useful and valuable animal should be still abandoned to the blind care, and often absurd and cruel practice, of a set of men who have neither understanding nor letters. Of the art, called by the antients *Medicina Veterinaria*, we now hardly know more than the name. If any physician would turn his views to this subject, and make it a principal object of his inquiry, I am convinced that he would be amply rewarded for his trouble; and that he would not only acquire a fortune, but obtain the highest reputation. This species of the medical art would by no means be conjectural, or so difficult as the other. The manners, the food, the influence of sentiment, and all the other causes of disorders, being less complicated in these animals than in man, their diseases must also be more simple, and, of course, more easily investigated and treated with success. To these advantages may be added the perfect liberty of making experiments, of trying new remedies, and of arriving, without fear or reproach, to a most extensive knowledge of this kind, from which, by analogy, deductions might be drawn of the greatest utility to the art of curing men.

SUPPLEMENT.

S U P P L E M E N T.

WE have already described the manner in which the horses of Arabia are treated, and given a detail of the pains and attention bestowed on their education. This dry and warm country, which appears to be the original climate of this beautiful animal, and most conformable to its nature, permits or requires a number of usages that cannot be practised, with equal effect, in any other region. In France, and other northern nations, it is impracticable to train and feed horses in the same way as is done in warm climates. But men, who are interested in these useful creatures, will not be displeased to learn how they are managed in countries less favoured by heaven than Arabia, and how they conduct themselves, when they act independent of the human species, and when left entirely to their own dispositions and instincts.

Horses are differently fed, according to the different countries to which they are transported, and the different uses to which they are destined. Those of the Arabian races intended for hunting in Arabia or Barbary, seldom eat herbage or grain. Their common food, which consists of dates and camels milk, is given them every morn-

ing and night. These aliments, instead of fattening them, render them meagre, nervous, and very fleet. They spontaneously suck the she-camels, whom they follow * till the time they are ready for mounting, which is not before the age of six or seven years.

In Persia, the horses are exposed night and day to the open air. But, to protect them from the injuries of the weather, from damp vapours, and from rain, they are covered, especially in winter, with cloths; and sometimes an additional covering is added, which is made of hair, and very thick. A spot of dry even ground is prepared for them, greater or smaller according to their number, which is swept and kept extremely clean. Here they are all tied to a long rope, which is well stretched, and firmly fixed at each end to two iron rods stuck in the earth. Their halters, however, are sufficiently free to allow them to move with ease. To prevent them from hurting each other, their hind-legs are tied with a rope, which has iron buckles at each extremity; these are brought about to the fore part of the horses, and fastened to the ground by pegs, but loose enough to allow them to lie down or to rise at their pleasure. When put into stables, they are managed in the same manner. Xenophon informs us, that this practice was observed in his days; and it is alledged, that, by this means, the animals are rendered
more

* Voyage de Marmol, tom. I. p. 50.

more gentle, and tractable, and less peevish among themselves; qualities extremely useful in war, when vicious horses, tied up in squadrons, often injure one another. For litter, the Persians use only sand or dry dust, upon which their horses lie down and sleep as well as if it were straw*. In other countries, as Arabia and the Mogul empire, the horses are littered with their own dung, well dried and reduced to a powder†. The eastern horses are never allowed to eat from the ground, or even from a rack; but are served with barley and cut straw in pocks tied to their heads; for, in these climates, no hay is made, nor do the natives cultivate oats. In spring, they are fed with grass or green barley, and great care is taken to give them only as much as is barely necessary; for too much nourishment makes their legs swell, and soon renders them useless. These horses, though ridden without bridle or stirrups, are easily managed. They carry their heads very high, by means of a simple snaffle, and run with great rapidity and sureness upon the worst roads. The whip and spur are very seldom employed. The latter, when used, consists only of a single point fixed to the heel of the boot. Their common whips are made of small strips of parchment knotted and twisted. A few lashes with this whip are sufficient for every purpose of the rider.

Horses

* Voyage della Valle, tom. 5. p. 284.

† Thevenot, tom. 3. p. 129.

Horses are so numerous in Persia, that, though excellent, they sell cheap. Some of them are very tall and heavy; but all of them are more remarkable for strength, than for gracefulness and beauty. For easy travelling, the Persians use pacing horses, which are taught this motion by tying the fore-foot to the hind-foot on the same side: When young, their nostrils are slit, from a notion that it makes them breathe more freely. These horses travel so well, that they perform with ease a journey of eight leagues without stopping*.

But Arabia, Barbary, and Persia, are not the only climates which produce good and handsome horses. Even in the coldest countries, if not too moist, these animals succeed better than in very warm climates. The beauty of the Danish horses, and the excellence of those of Sweden, Poland, &c. are universally known. In Iceland, where the cold is excessive, and where often no other food can be had than dried fishes, the horses, though small, are extremely vigorous†; some of them are indeed so diminutive as to be fit for carrying children only‡. Besides, they are so plentiful in this island, that the shepherds tend their flocks on horseback. Their number is not expensive; for their food costs nothing. Such as the owners can apply to no immediate use, they mark, and turn out to the mountains.

There

* Della Valle, tom. 5. p. 284.

du Nord, tom. 1. p. 18.

land, p. 79.

† Recueil des voyag.

‡ Anderson's description of Ice-

There they soon become wild; and, when wanted, are hunted in troops, and caught with long ropes. When the mares foal in the mountains, the proprietors put their peculiar marks on the young, and leave them there for three years. Those horses which are brought up in the mountains, are generally more handsome, bold, and fleet, than those raised in stables*.

The Norwegian horses are likewise small, but well-proportioned. Most of them are yellow, with a black line running the whole length of the back. Some of them are chesnut, and others of an iron-gray colour. These horses are very sure-footed, travel with great caution through the rough paths of the mountains, and slide down steep declivities, by bringing their hind-feet under their bellies. They defend themselves against the assaults of the bear. When a stallion, in company with mares or foals, perceives this voracious animal, he makes them stay behind, approaches, and boldly attacks the enemy, whom he beats with his fore-feet, and generally kills. But, if the horses attempt to defend themselves by striking with their hind-feet, they are infallibly gone; for the bear leaps upon their backs, where he sticks with such force as suffocates them in a short time †.

The horses of Nordland never exceed four feet and a half in height ‡. The nearer we approach

* Hist. gen. des voyag. tom. 18. p. 19.

† Pontoppidan, hist. nat. of Norway.

‡ 12 1 half hands,

proach to the pole, we find that horses become smaller and weaker. Those of West Nordland are of a singular form. They have large heads and eyes, short necks, large poitrels, narrow withers, long thick bodies, short loins; the upper part of their legs is long, and the under short and naked; their hoofs are small and hard; their tails and manes are large and bushy; and their feet are small, but sure, and never defended with shoes. These horses are good, seldom restive or stubborn, and climb with patience the highest mountains. The pasture in Nordland is so excellent, that, when horses are brought from thence to Stockholm, they seldom remain above a year without losing their flesh and their vigour. On the contrary, when horses are carried from more northern countries to Nordland, though sickly for the first year, they recover their strength *.

Excess of heat or of cold seems to be equally hostile to the stature of horses. The Japanese horses are generally small, though some of them are of a tolerable size. The latter probably come from the mountains of that country. The same remark applies to the horses of China. We are assured, however, that those of Tonquin are nervous, of a good size, gentle, and easily trained to any kind of exercise †.

It

* Hist. gen. des voyag. tom. 19. p. 561.

†. Hist. de Tonquin, par le P. de Rhodes, p. 51.

It is well known, that horses bred in dry warm climates degenerate, and even cannot live, in moist countries, however warm. But they succeed very well in all the mountainous countries of our continent, from Arabia to Denmark and Tartary, and, in America, from New Spain to the lands of Magellan. It is, therefore, neither heat nor cold, but moisture alone, that is noxious to these animals.

There were no horses in America when it was discovered. But, in less than two centuries after a small number of them had been transported thither from Europe, they multiplied so prodigiously, especially in Chili, that they sold at very low prices. Frezier remarks, that this great increase was still more surprising, because the Indians eat horses, and kill many of them by fatigue and bad management *. The horses carried by the Europeans to the most eastern parts of our continent, as the Philippine islands, have likewise multiplied exceedingly †.

In the Ukraine ‡, and among the Cossacks along the river Don, the horses live wild in the fields and forests. In that large and thinly peopled

* Voyage de Frezier dans la mer sud, p. 67.

† Voyage de Gemelli Careri, tom. 5. p. 162.

‡ There are horses in the Ukraine which go in troops of five or six hundred. They are fit for no service, but make good eating. Their flesh is agreeable, more tender than veal, and the natives eat it with pepper. The old horses are fattened for the market, and are sold to the Tartars as dear as beef or mutton; *Descript. de l'Ukraine, par Beauplan.*

peopled country comprehended between the Don and the Nieper, the horses go in troops of three, four, or five hundred, and have no shelter even when the ground is covered with snow, which they remove with their fore-feet in quest of food. These troops are guarded by two or three men on horseback; and it is only in severe winters that they are lodged for a few days in the villages, which, in this country, are very distant from each other. These troops of horses give rise to some remarks, which seem to prove that men are not the only animals who live in society, and obey, by compact, the commands of one of their own number. Each of these troops have a chief whom they implicitly obey; he directs their course, and makes them proceed or stop at his pleasure. This chief likewise gives orders for the necessary arrangements and motions, when the troop is attacked by robbers or by wolves. He is extremely vigilant and alert: He frequently runs round the troop; and, when he finds any horses out of their rank, or lagging behind, he gives them a push with his shoulder, and obliges them to take their proper station. These animals, without being mounted or conducted by men, march in nearly as good order as our trained cavalry. Though at perfect liberty, they pasture in files and brigades, and form different companies, without ever mixing or separating. The chief occupies this important and fatiguing office for four or five years. When he

he becomes weaker and less active, another horse, ambitious of command, and who feels his own strength, springs out from the troop, attacks the old chief, who, if not vanquished, keeps his command; but, if beat, enters with shame into the common herd; and the conqueror takes the lead, is recognised as sovereign, and obeyed by the whole troop *.

In Finland, when the snows are dissolved in the month of May, the horses depart from their masters, and go into certain districts of the forests, as if they had previously fixed a rendezvous. There they form different troops, which never separate or intermix. Each troop take a different district of the forest for their pasture. To this territory they confine themselves, and never encroach on the lands belonging to other troops. When the grass is exhausted, they decamp, and take possession of a fresh pasturage in the same order as before. The police of their society is so well regulated, and their marches so uniform, that their owners always know where to find their horses, when they have occasion for them; and those which are carried off, after having performed their task, return, of their own accord, to their companions in the woods. In the month of September, when the weather turns bad, they quit the forest, march

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* Extract from a Memoir communicated to M. de Buffon, by M. Sanchez, formerly chief physician to the Russian army.

home in troops, and each takes possession of his own stable.

These horses are small, but good and spirited, without being vicious. Though generally very docile, some of them resist when their owners offer to take them, or to yoke them in carriages. When they return from the forests, they are fat and in fine order. But the perpetual labour they undergo during the winter, and the small quantity of food they receive, soon make them lose their flesh. They roll on the snow as other horses do on the grass. They pass the night, indifferently, either in the court or in the stable, even during the most violent frosts *.

These horses, which live in troops, and are often removed from the dominion of man, form the link or shade between domestic and wild horses. Of the latter there are some in the island of St Helena, which, after being transported thither from Europe, became so savage and ferocious, that, rather than suffer themselves to be taken, they leap over the highest precipices into the sea †. In the environs of Nippes, some of them are not larger than asses; but they are rounder, and well proportioned. They are vivacious, indefatigable, and possess a strength and dexterity beyond what could be expected from them. In Saint Domingo, the horses are of a middle stature, and much esteemed. Numbers
of

* Journ. d'un Voyag. au Nord, par M. Outhier.

† Mem. pour servir à l'histoire des Indes Orientales, p. 199.

of them are taken with snares and ropes; but most of these continue to be extremely restless and skittish *. There are also horses in Virginia, which, though sprung from the domestic kind, have become so ferocious in the woods, that it is difficult to approach them, and, when taken, they belong to the person who apprehends them. They are commonly so stubborn that it is no easy matter to tame them †. In Tartary, and particularly in the country between Urgenz and the Caspian sea, birds of prey are employed in hunting wild horses. These birds are trained to seize the horse by the neck and head, who fatigues himself by running, but is unable to disengage himself ‡ from his tormentor. The wild horses in the country of the Mongous and Kakas Tartars, differ not from those which are tame. They are found in great numbers upon the western coast; and some appear in the country of the Kakas which borders on the *Harni*. These wild horses are so swift, that they often escape the arrows of the most dexterous hunters. They march in numerous troops; and, when they chance to meet with tamed horses, they surround them and oblige them to fly §. In Congo, considerable numbers of wild horses are still to be found ||. They are sometimes

* Nouveau voyag. aux isles de l'Amerique, tom. 5. p. 192.

† Hist. de la. Virginia, p. 406.

‡ Hist. gen. des voyag. tom. 8. p. 156. § Ib. tom. 6. p. 602.

|| Il genio vagante del Conte Aurelio degli Auzi, tom. 2. p.

seen also in the environs of the Cape of Good Hope ; but they are seldom taken, because the inhabitants prefer the horses transported from Persia *.

When formerly treating of the horse, I remarked, that, from all the observations of the breeders of horses, the male appeared to have greater influence upon the offspring than the female ; and I then gave some reasons which rendered the universality of this fact doubtful, and even made it probable that the influence of the male and female were equal. But numerous experiments and observations have now convinced me, that, not only in horses, but in man and every other animal, the male has more influence on the external form of the young than the female, and that, in every species, the male is the principal type of the race.

I have said †, that, in the common order of Nature, it is not the males, but the females, which constitute the unity of the species : But this prevents not the male from being the true type of each species ; and, what I have advanced concerning unity, ought to be extended only to the greater facility of representing the species possessed by the female, though she submits to the embraces of different males. This point I have fully discussed in my history of birds ‡, and,

* Description du Cap, par Kolbe, tom. 3. p. 20.

† See below, vol. 8. art. Degeneration of animals,

‡ Hist. Nat. des oiseaux, tom 4.

and, in the present work, under the article *Mule*; from which it appears, that, though the female seems to have more influence upon the specific character of the breed, she never improves it, the male alone enjoying the faculty of supporting the purity of the race, and of rendering it more perfect.

THE

T H E A S S *.

THIS animal, even when examined with minute attention, has the appearance of a degenerated horse. The exact similarity in the structure of the brain, lungs, stomach, intestinal canal, heart, liver, and other viscera, and the great resemblance of the body, legs, feet, and whole skeleton, seem to support this opinion. The slight differences which take place between these two animals may be attributed to the long continued influence of climate and food, and to a fortuitous succession of many generations of small wild horses, who, by gradually degenerating, at last produced a new and permanent species, or rather a race of similar individuals, all marked with the same defects, and differing so widely from the genuine horse, as to be regarded as constituting a new species. The greater variety in the colour of horses than of asses appears to favour this idea: This circumstance shows

* The Ass has long flouching ears and a short mane. The tail is covered with long hairs at its termination only; and the body is generally of an ash colour, with a black bar cross the shoulders. His hoof consists of one piece; and he has six cutting teeth in each jaw.

shows that the former have been longer in a domestic state ; for the colour of all domestic animals varies much more than that of wild ones of the same species. Besides, the wild horses mentioned by travellers are generally small, and have, like the ass, gray hair, and a naked tail, tufted at the extremity. Some wild, as well as domestic horses, have likewise a black line on the back, and other characters which make them nearly approach to the ass.

On the other hand, if we attend to the differences of temperament, dispositions, manners, and, in a word, of the general result of the organization of these two animals, particularly the impossibility of their commixture, so as to form a common, or even an intermediate species, capable of procreating, the opinion, that they were originally distinct species, equally removed from each other as at present, will appear to be the most probable. The ass, besides, differs materially from the horse, in smallness of stature, thickness of the head, length of the ears, hardness of the skin, nakedness of the tail, the form of the buttocks, and the dimensions of the adjacent parts, the voice, the appetite, the manner of drinking, &c. Is it possible that animals so essentially different, should spring from the same original stock ? Are they, to use the language of nomenclators *, of the same family ? Or rather,

* *Equus caudâ undique setosa*, the horse ; *equus caudæ extremitate setosa, cruce nigra supra humeros*, the ass. Lyn. Syst. Nat. Class. 1. ord. 6.

are they not, and have they not always been, distinct animals?

Philosophers will perceive the extent, the difficulties, and the importance of this question, which we shall here discuss, only because it for the first time occurs. It relates to the production of beings, and, for its illustration, requires that we should consider Nature under a new point of view. If, from the immense number of animated beings which people the universe, we select a single animal, or even the human body, as a standard, and compare all other organized beings with it, we shall find that each enjoys an independent existence, and that the whole are distinguished by an almost infinite variety of gradations. There exists, at the same time, a primitive and general design, which may be traced to a great distance, and whose degradations are still slower than those of figure or other external relations: For, not to mention the organs of digestion, of circulation, or of generation, without which animals could neither subsist nor reproduce, there is, even among the parts that contribute most to variety in external form, such an amazing resemblance as necessarily conveys the idea of an original plan upon which the whole has been conceived and executed. When, for example, the parts constituting the body of a horse, which seems to differ so widely from that of man, are compared in detail with the human frame, instead of being struck with the difference,

ence, we are astonished at the singular and almost perfect resemblance. In a word, take the skeleton of a man, incline the bones of the pelvis, shorten those of the thighs, legs, and arms, lengthen the bones of the feet and hands, join the phalanges of the fingers and toes, lengthen the jaws by shortening the frontal bone, and, lastly, extend the spine of the back: This skeleton would no longer represent that of a man, but would be the skeleton of a horse; for, by lengthening the back-bone and the jaws, the number of vertebrae, ribs, and teeth, would likewise be augmented; and it is only by the number of these bones, which may be regarded as accessory, and by the prolonging, contracting, or junction of others, that the skeleton of a horse differs from the skeleton of a man. But, to trace these relations more minutely, let us examine separately some parts which are essential to the figure of animals, as the ribs: These we find in man, in all quadrupeds, in birds, in fishes, and the vestiges of them are apparent even in the shell of the turtle: Let us next consider, that the foot of a horse, so seemingly different from the hand of a man, is, however, composed of the same bones, and that, at the extremity of each finger, we have the same small bone, resembling a horse-shoe, which bounds the foot of that animal. From these facts we may judge, whether this hidden resemblance is not more wonderful than the apparent differences; whe-

ther this constant uniformity of design, to be traced from men to quadrupeds, from quadrupeds to the cetaceous animals, from the cetaceous animals to birds, from birds to reptiles, from reptiles to fishes, &c. in which the essential parts, as the heart, the intestines, the spine, the senses, &c. are always included, does not indicate, that the Supreme Being, in creating animals, employed only one idea, and, at the same time, diversified it in every possible manner, to give men an opportunity of admiring equally the magnificence of the execution and the simplicity of the design ?

In this view, not only the horse and ass, but man, monkeys, quadrupeds, and every species of animal, may be considered as one family. But from this are we warranted to conclude, that, in this great and numerous family, which were brought into existence by the Almighty alone, there are lesser families conceived by Nature, and produced by time, of which some should only consist of two individuals, as the horse and ass, others of several individuals, as the weasel, the ferret, the martin, the pole-cat, &c. ; and, at the same time, that, among vegetables, there are families consisting of ten, twenty, thirty, &c. plants ? If these families really existed, they could only be produced by the mixture and successive variation and degeneration of the primary species : And, if it be once admitted that there are families among plants and animals,

mals, that the ass belongs to the family of the horse, and differs from him only by degeneration; with equal propriety may it be concluded, that the monkey belongs to the family of man; that the monkey is a man degenerated; that man and the monkey have sprung from a common stock, like the horse and ass; that each family, either among animals or vegetables, has been derived from the same origin; and even that all animated beings have proceeded from a single species, which, in the course of ages, has produced, by improving and degenerating, all the different races that now exist.

Those naturalists who, on such slight foundations, have established families among animals and vegetables, seem not to have considered, that, if their doctrine were true, it would reduce the product of the creation to any assignable number of individuals, however small: For, if it were proved, that animals and vegetables were really distributed into families, or even that a single species was ever produced by the degeneration of another, that the ass, for instance, was only a degenerated horse, no bounds could be fixed to the powers of Nature: She might, with equal reason, be supposed to have been able, in the course of time, to produce, from a single individual, all the organized bodies in the universe.

But this is by no means a proper representation of Nature. We are assured by the authority

rity of revelation, that all animals have participated equally of the favours of creation ; that the two first of each species were formed by the hands of the Almighty ; and we ought to believe that they were then nearly what their descendants are at present. Besides, since Nature was observed with attention, since the days of Aristotle to those of our own, no new species have appeared, notwithstanding the rapid movements which break down and dissipate the parts of matter, notwithstanding the infinite variety of combinations which must have taken place during these twenty centuries, notwithstanding those fortuitous or forced commixtures between animals of different species, from which nothing is produced but barren and vitiated individuals, totally incapable of transmitting their monstrous kinds to posterity. Were the external or internal resemblances of particular animals, therefore, still greater than they are between the horse and ass, they should not lead us to confound these animals, or to assign them a common origin. For, if they actually proceeded from the same stock, we would be enabled to bring them back to their primitive state, and thus, with time, destroy the supposed operations of time.

It should likewise be considered, that, though Nature proceeds with gradual, and often imperceptible steps ; yet the intervals or marks of distinction are not always equal. The more dignified

nified the species, they are always the less numerous, and separated by more conspicuous shades. The diminutive species, on the contrary, are very numerous, and make nearer approaches towards each other. For this reason, we are often tempted to erect them into families. But it should never be forgotten, that these families are of our own creation; that we have contrived them to ease our memories, and to aid our imagination; that, if we cannot comprehend the real relations of all beings, it is our own fault, not that of Nature, who knows none of those spurious families, and contains, in fact, nothing but individuals.

An individual is a solitary, a detached being, and has nothing in common with other beings, excepting that it resembles, or rather differs from them. All the similar individuals which exist on the surface of the earth, are regarded as composing the species of these individuals. It is neither, however, the number, nor the collection, of similar individuals, but the constant succession and renovation of these individuals, which constitutes the species. A being, whose duration was perpetual, would not make a species. Species, then, is an abstract and general term, the meaning of which can only be apprehended by considering Nature in the succession of time, and in the constant destruction and renovation of beings. It is by comparing present individuals with those which are past, that we acquire

acquire a clear idea of species; for a comparison of the number or similarity of individuals is only an accessory idea, and often independent of the first: The ass resembles the horse more than the spaniel does the grayhound; and yet the latter are of the same species, because they produce fertile individuals; but, as the horse and ass produce only unfertile and vitiated individuals, they are evidently of different species.

It is in the characteristic diversities of species, therefore, that the intervals in the shades of nature are most conspicuously marked. We may even affirm, that these intervals between different species are the most equal and constant, since we can draw a line of separation between two species, that is, between two successions of individuals who reproduce, but cannot mix; and, as we can also unite into one species two successions of individuals who reproduce by mixing. This is the most fixed and determined point in the history of nature. All other similarities and differences which can be found in the comparison of beings, are neither so real nor so constant. These intervals are the only lines of separation which shall be followed in this work. We shall introduce no artificial or arbitrary divisions. Every species, every succession of individuals, who reproduce and cannot mix, shall be considered and treated separately; and we shall employ no other families, genera, orders, and classes, than what are exhibited by Nature herself.

Species

Species being thus confined to a constant succession of individuals endowed with the power of reproduction, it is obvious that this term ought never to be extended beyond animals and vegetables, and that those nomenclators who have employed it to distinguish the different kinds of minerals have abused terms and confounded ideas. We should not, therefore, consider iron as one species, and lead as another species: They ought only to be regarded as two different metals, and should be distinguished by lines of separation very different from those employed in the distinctions of animals or vegetables.

But to return to the degeneration of beings, and particularly to that of animals. Let us examine more closely the proceedings of Nature in the varieties she offers to our consideration: And, as we are best acquainted with the human species, let us observe how far the varieties of it extend. Among men, all the gradations of colour, from black to white, are exhibited: They likewise differ, by one half, in height of stature, thickness, strength, swiftness, &c. But their mind is always the same. This latter quality, however, belongs not to matter, and ought not to be treated of in this place. The others are the common variations of Nature effected by the influence of climate and of food. But these differences in colour and dimensions prevent not the Negro and White, the Laplander and Patagonian, the giant and dwarf, from mixing together

ther and producing fertile individuals; and, consequently, these men, so different in appearance, are all of one species, because this uniform reproduction is the very circumstance which constitutes distinct species. Beside these general varieties, there are others of a more particular nature, and yet fail not to be perpetuated; as the enormous legs of *the race of St Thomas* in the island of Ceylon *; the red eyes and white hair of the Dariens and Chacrelas; the six fingers and toes peculiar to certain families †, &c. These singular varieties are accidental redundancies or defects, which, originating from some individuals, are propagated from generation to generation, like hereditary diseases. But they ought not to be regarded as constituting particular species; since these uncommon races of men with gross limbs, or with six fingers, are capable of mixing and of producing fertile individuals: The same remark is applicable to all other deformities which are communicated from parents to children.

Thus far only the errors of Nature and the varieties among men extend. If there are individuals who degenerate still farther, they produce nothing, and change not the constancy and unity of the species. Hence man constitutes but one and the same species; and, though this species be, perhaps, the most numerous, capricious,

* See vol. 2. under the article, *Varieties of the human species*.

† See this and other curious subjects relative to generation, &c. in les lettres de M. de Maupertuis.

cious, and irregular in its actions; yet all the diversities in movement, food, climate, and other combinations which may be conceived, have not produced beings so different from each other as to constitute new species, and, at the same time, so similar to ourselves as to be considered as belonging to us.

If the Negro and the White could not propagate, or if their productions remained barren, they would form two distinct species; the Negro would be to man what the ass is to the horse; or, rather, if the White were man, the Negro would be a separate animal, like the monkey; and we would be entitled to pronounce that the White and the Negro had not a common origin. But this supposition is contradicted by experience; for, as all the varieties of men are capable of mixing together, and of transmitting the kind, they must necessarily have sprung from the same stock or family.

A slight disparity of temperament, or some accidental defect in the organs of generation, will render two individuals of the same species barren. A certain degree of conformity in the structure of the body, and in the organs of generation, will enable two animals, of different species, to produce individuals, similar to none of the parents, resembling nothing fixed or permanent; and, therefore, incapable of producing. But, what an amazing number of combinations are included in the supposition, that two animals,

mals, a male and a female, of a particular species, should degenerate so much as to form a new species, and to lose the faculty of producing with any other of the kind but themselves? It is still more incredible that the offspring of such degenerated creatures should follow exactly the same laws which are observed in the procreation of perfect animals: For a degenerated animal is a vitiated production; and how should an origin that is vitiated, depraved, and defective, constitute a new stock, and not only give rise to a succession of permanent and distinct beings, but even to produce them in the same manner, and according to the same laws which regulate the propagation of animals whose race is pure and uncorrupted?

Though, therefore, we cannot demonstrate, that the formation of a new species, by means of degeneration, exceeds the powers of Nature; yet the number of improbabilities attending such a supposition, renders it totally incredible: For, if one species could be produced by the degeneration of another, if the ass actually originated from the horse, this metamorphosis could only have been effected by a long succession of almost imperceptible degrees. Between the horse and ass, there must have been many intermediate animals, the first of which would gradually recede from the nature and qualities of the horse, and the last would make equal advances to those of the ass. What is become of these intermediate beings?

ings? Why are their representatives and descendants now extinguished? Why should the two extremes alone exist?

We may, therefore, without hesitation, pronounce the ass to be an *Ass*, and not a degenerated horse, a horse with a naked tail. The ass is not a marvellous production. He is neither an intruder nor a bastard. Like all other animals, his family, his species, and his rank, are ascertained and peculiar to himself. His blood is pure and untainted: And, though his race be less noble and illustrious, it is equally unalloyed, and as antient as that of the horse. Why, then, should an animal so good, so patient, so temperate, and so useful, be treated with the most sovereign contempt? Do men despise, even in the brute-creation, those who serve them best, and at the least expence? The horse we educate with great care; we dress, attend, instruct, and exercise him: While the poor ass, abandoned to the brutality of the meanest servants, or to the malicious abuse of children, instead of acquiring, is rendered more stupid and indocile, by the education he receives. If he had not a great stock of good qualities, they would necessarily be obliterated by the manner in which he is treated. He is the sport and pastime of rusticks, who conduct him with a rod, who beat, overload, and abuse him, without precaution or management. We consider not, that, if the horse had no existence, the ass, both in himself and with regard to us, would be the first, handsomest,

loveliest, most beautiful, and most distinguished animal in the creation. He holds, however, only the second, instead of the first rank; and, for that reason, he is neglected and despised. It is comparison alone that degrades him. We view and judge of him, not as he is, but in comparison with the horse. We forget that he is an ass, that he has all the qualities and endowments peculiar to his species; and we contemplate the figure and qualities of the horse, which the ass neither has, nor ought to possess.

In his disposition, the ass is equally humble, patient, and tranquil, as the horse is proud, ardent, and impetuous. Chastisement and blows he endures with constancy, and perhaps with courage. He is temperate both as to the quantity and quality of his food. He eats contentedly the hardest and most disagreeable herbage, which the horse and other animals pass by and disdain. With regard to water, he is extremely nice. He drinks only from the clearest brooks he can find. In drinking, he is equally moderate as in eating. He never sinks his nose in the water, being afraid, as has been alledged, of the shadow of his ears *. As no body takes the trouble of combing him, he often rolls on the grass, among thistles or ferns. Without paying any regard to the load he carries, he lies down and rolls as often as he can, seemingly with a view to reproach the neglect of his master; for he

never
* Cardan de subtilitate, lib. 1. cap. 10. of his legs, which he

never wallows, like the horse, in the mire or in water. He is even afraid of wetting his feet, and turns off the road to avoid a puddle. His legs are also drier and cleaner than those of the horse. He is so susceptible of education, as to be sometimes exhibited in public shews *.

The ass, when young, is gay, handsome, nimble, and even graceful. But, whether from age or maltreatment, he soon loses these qualities, and becomes sluggish, untractable, and stubborn. He discovers no ardour but in love. When under the influence of this passion, he is so furious that nothing can restrain him; and, by excessive indulgence, he sometimes dies soon after gratification. As his love rises to a degree of madness, his attachment to his progeny is likewise excessive. We are told by Pliny, that when the young is separated from the mother, she will pass through flames to rejoin it. Though commonly abused, the ass has a great affection for his master, whom he scents at a distance, and distinguishes him from every other person. He knows likewise the places where his master puts up, and the roads which he frequents. His eyes are exceedingly good; his sense of smelling is admirable, especially when in quest of a female. His ear is excellent, which has contributed to make him be ranked among the timid animals, who are all said to have long ears and acute hearing. When oppressed with too great a load, he

* Aldrovand. de quadruped. solidiped. lib. 1. p. 308.

he discovers his uneasiness by inclining his head, and lowering his ears. When tormented by a base, he opens his mouth and draws back his lips in a most disagreeable manner, which gives him an air of scorn and derision. If his eyes be covered, he stands immoveably still; and, when lying on one side, if the one eye rests on the ground, and the other be covered with a stone or any other opaque body, he will continue in that situation, without making the smallest effort to rise. He walks, trots, and gallops like the horse: But all his movements are slower and more circumscribed. Though he can run, when he first sets out, with considerable swiftness, he only continues his career for a short time; and, whatever pace he assumes, if pushed hard, he is soon fatigued.

The horse neighs; but the ass brays: The last is performed by a very loud, long, disagreeable, discordant cry, consisting of discords alternately sharp and flat. He seldom brays but when pressed with hunger or love. The voice of the female is more clear and piercing than that of the male. When gelded, the ass brays with a low voice; and, though he makes the same efforts and the same motions of the throat, yet the sound reaches to no great distance.

Of all quadrupeds, the ass is least infested with lice or other vermin, which seems to be owing to the superior hardness and dryness of his skin.

For

For the same reason, he is less sensible to the whip, or the stinging of flies, than the horse.

At the age of two years and a half, the first middle cutting teeth fall out, and the others on each side soon follow. They are replaced in the same time and in the same order as those of the horse. The age of the ass is also distinguishable, as in the horse, by the same marks in the teeth.

The ass, when two years and a half old, is capable of procreating. The female is still more early, and equally lascivious, which last is assigned as the reason for her want of fecundity. She rejects the cause of conception, unless the ardour of her desire be repressed by blows. Without this precaution, she is seldom impregnated. The ordinary season of love is the months of May and June. When pregnant, she soon becomes cool; and, in the eighth month, the milk appears in her paps. In the twelfth month, she brings forth; and solid masses are often found in the liquor of the amnios, similar to the hippomanes of the foal. Seven days after delivery, her ardour returns, and she is in a condition to receive the male. Thus the female ass may be said to be capable of perpetually nourishing and engendering. She produces but one colt; and there are very few examples of her bringing forth two at a time. At the end of five or six months, the colt may be weaned, especially if the mother be pregnant, to enable her to afford proper nourishment to the foetus. The jack-

jack-ass should be chosen from the largest and strongest of his species. He should be at least three years of age, and should never exceed ten. He should have long limbs, a strong body, an elevated and small head, vivacious eyes, large nostrils and chest, fleshy loins, broad ribs, flat buttocks, a short tail, and shining, soft hair of a deep gray colour.

The ass, like the horse, takes three or four years before he arrives at full maturity; and, of course, he lives to the age of 25 or 30 years. The females are said to live longer than the males. But this circumstance is probably owing to the females being often pregnant, and more humanely treated; while the males are perpetually persecuted with blows and excessive labour. They sleep less than the horse, and never lie down to sleep but after vast fatigue. The jack-ass lives longer than the stallion. The ardour of the former increases with his years; and, in general, the health of this animal is more permanent and established than that of the horse. The ass is less delicate, and subject to much fewer distempers. The ancients mention no other disease of the ass but the glanders, to which, as formerly remarked, he is still less liable than the horse.

Of asses there are different races, as well as of horses. But they are not equally known; because they have neither been taken care of nor traced with the same attention. It cannot, however,

ever, admit of a doubt, that they all originated from warm climates. Aristotle assures us *, that, in his time, there were no asses in Scythia, or other northern nations, nor even in France, the climate of which, he remarks, was too cold: He adds, that cold climates either render them barren, or make them degenerate, which is the reason why they are small and feeble in Illyria, Thracia, and Epirus. They are still so in France, though they have been long naturalized, and though, within these two thousand years, the cold of the climate has been greatly diminished by the cutting down of vast forests, and the draining of marshes. But it is more certain, that they have not long resided in Sweden and other northern countries †. They appear to have come originally from Arabia, and to have passed from Arabia to Egypt, from Egypt to Greece, from Greece to Italy, from Italy to France, and from thence to Germany, Britain, Sweden, &c.; for it is a known fact, that they are weak and small in proportion to the coldness of the climate.

This migration appears to be well supported by the relations of travellers. Chardin remarks, ' That there are two kinds of asses in Persia, ' one of which is slow and heavy, and used only ' for carrying burdens; the other race come ' from Arabia, and are the handsomest and finest
VOL. III. G g g asses

* De generat. animal. lib. 12.

† Linnæi Faun. Suec.

' asses in the world. They have a glossy skin,
 ' a high head, and nimble limbs: They move
 ' well, and are employed only for riding.
 ' The saddles which are put upon them resemble
 ' round pannels, flattened above. They are
 ' made of woollen cloth, or of tapestry, with
 ' trappings and stirrups. The rider sits nearer
 ' the crupper than the neck. Some of these
 ' asses cost 400 livres, and they cannot be had
 ' for less than 25 pistoles. They are dressed
 ' like horses, and are never learned any motion
 ' but that of pacing. The art of training them
 ' consists of tying each fore-foot to the hind
 ' foot of the same side with two cords, which
 ' are made of the length that the ass is to pace,
 ' and are suspended by another cord passed un-
 ' der the girth to the stirrup-leather. They
 ' are exercised by grooms, every morning and
 ' evening, to this kind of motion. Their noses
 ' are slit, to make them breathe more freely;
 ' and they go so quick, that a horse must gal-
 ' lop in order to keep up with them.'

It were to be wished that the Arabians, who
 preserve with so much care, and for so long a
 time, the races of their horses, would pay equal
 attention to their asses: From the above passage,
 and other sources of information, however, it
 appears, that Arabia is the original and best cli-
 mate for both animals. From Arabia the asses
 passed into Barbary * and Egypt, where they

are

* See Shaw's travels.

are large and handsome. In India and Guiney *, they are larger, stronger, and more useful than the horses of these countries. They are in high estimation at Madura †, where one of the most considerable tribes of Indians reveré them in a peculiar manner, because they believe that the souls of all the nobility pass into the bodies of asses. Lastly, the number of asses exceeds that of horses in all the southern regions from Senegal to China. Wild asses are likewise more common than wild horses. The Latins, copying the Greeks, called the wild ass *onager*, which should not be confounded, as most naturalists and travellers have done, with the zebra, because the zebra is an animal of a different species from that of the ass. The onager, or wild ass, is not striped like the zebra, and is not nearly of so elegant a figure. Wild asses are found in some of the islands of the Archipelago, and particularly in that of Cerigo ‡. There are many of them in the deserts of Lybia and Numidia §. They are gray, and run so fleet, that they can only be overtaken in the chace by the best Barbary horses. When they see a man, they give a loud cry, fling up their heels, stop, and fly not till he makes a near approach. They are caught in snares and gins made of ropes. They pasture in

* Le voyage de Guinée de Bosman, p. 239.

† Lettres édifiantes, douzième recueil, p. 36.

‡ Dapper's collection, p. 185.

§ Leonis Afric. de Afric. descript. tom. 2. p. 52. et l'Afrique de Marmol, tom.

1. p. 53.

in troops; and their flesh is eaten by the natives. In the days of Marmol, there were wild asses in Sardinia; but they were smaller than those of Africa; and Pietro della Valle says, that he saw a wild ass in Bassora *. He differed not in figure from the domestic ass, only his colour was clearer, and he had, from the head to the tail, a line of white hair. He was also more vivacious and swift than common asses. Olearius relates †, that one day the King of Persia invited him to the top of a small building, in form of a theatre, to partake of a collation of fruits and sweet-meats; that, after the repast, thirty-two wild asses were introduced; that the King amused himself by shooting a few bullets and arrows at them; that he then allowed the same privilege to some of the nobility and ambassadors; that it was no small entertainment to see these asses running about, biting, and kicking each other, with several arrows sticking in their bodies; and that, when the whole were killed in presence of the King, they were sent to Isfahan for the royal family, the Persians being extremely fond of ass's flesh, &c. It does not appear, however, that all these 32 wild asses were taken in the forests. It is more probable that they were brought up in large parks for the pleasure of chasing and eating them.

Neither asses nor horses were found in America, though the climate of South America is very

* Voyages de Pietre della Valle, tom. 8. p. 49.

† Voyage d'Adam Olearius, tom. 1. p. 511.

very agreeable to their nature. Those transported thither by the Spaniards, and left in large islands, or in the continent, have multiplied exceedingly. They pasture in troops, and are taken by snares, like the wild horses.

The jack-ass and mare produce the large mules; and the horse and she-ass produce the smaller mules, which differ, in several respects, from the former. But, as we mean to treat of the generation of mules, jumars, &c. in a separate dissertation, we shall finish the history of the ass with the uses men derive from this animal.

Wild asses being unknown in our climates, we cannot determine whether their flesh makes a wholesome or savoury dish. But this we know, that the flesh of the domestic ass is worse, harder, and more disagreeably insipid than that of the horse. Galen says, that it is a pernicious aliment, and produces diseases. The milk of the ass, on the contrary, is an approved remedy and specific against certain distempers. The use of this remedy has been transmitted to us by the Greeks. To have good milk, the she-ass should be young, healthy, and plump, not long after delivery, and uncovered; the colt should be taken from her; she ought to be kept by herself, and fed with hay, oats, barley, and such salutary herbs as may have an influence on the malady. The milk should never be allowed to cool,

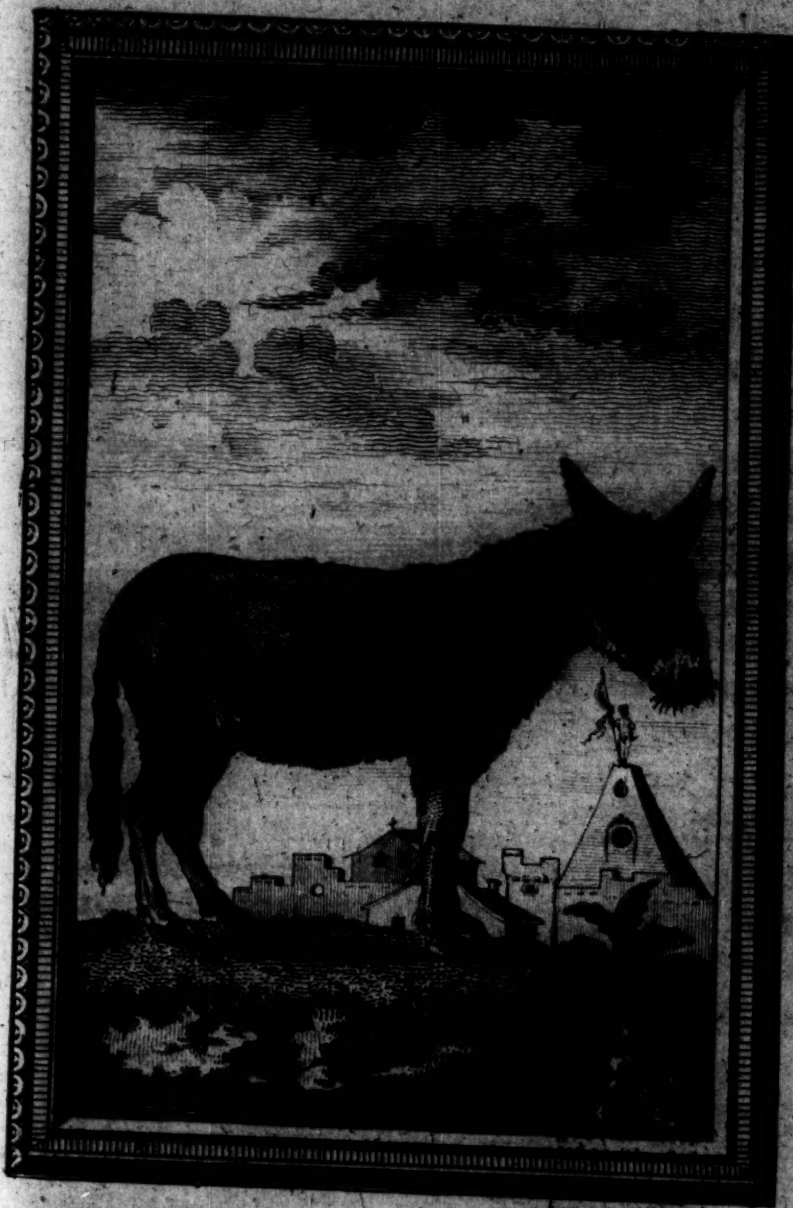
and may even be exposed to the air, which injures it in a very short time. The skin of the ass is very hard and elastic; it is applied to many different uses. It is employed for making shoes, drums, shoes, and pocket-book parchment, which is laid over with a slight coat of plaster. The ass skin is likewise used by the eastern nations for making their saggi or chagrin*. It is also probable, that the bones of the ass are harder than those of other animals, since the ancients preserved it for making their best sounding flutes.

In proportion to his size, the ass can carry more weight than any other animal. As he is fed at very little expence, and requires hardly any care, he is of great use for different kinds of country-business. He may likewise be used for riding: All his motions are soft, and he is not so apt to stumble as the horse. In countries where the land is light, he is often yoked in the plough; and his dung, in strong moist land, is an excellent manure.

THE

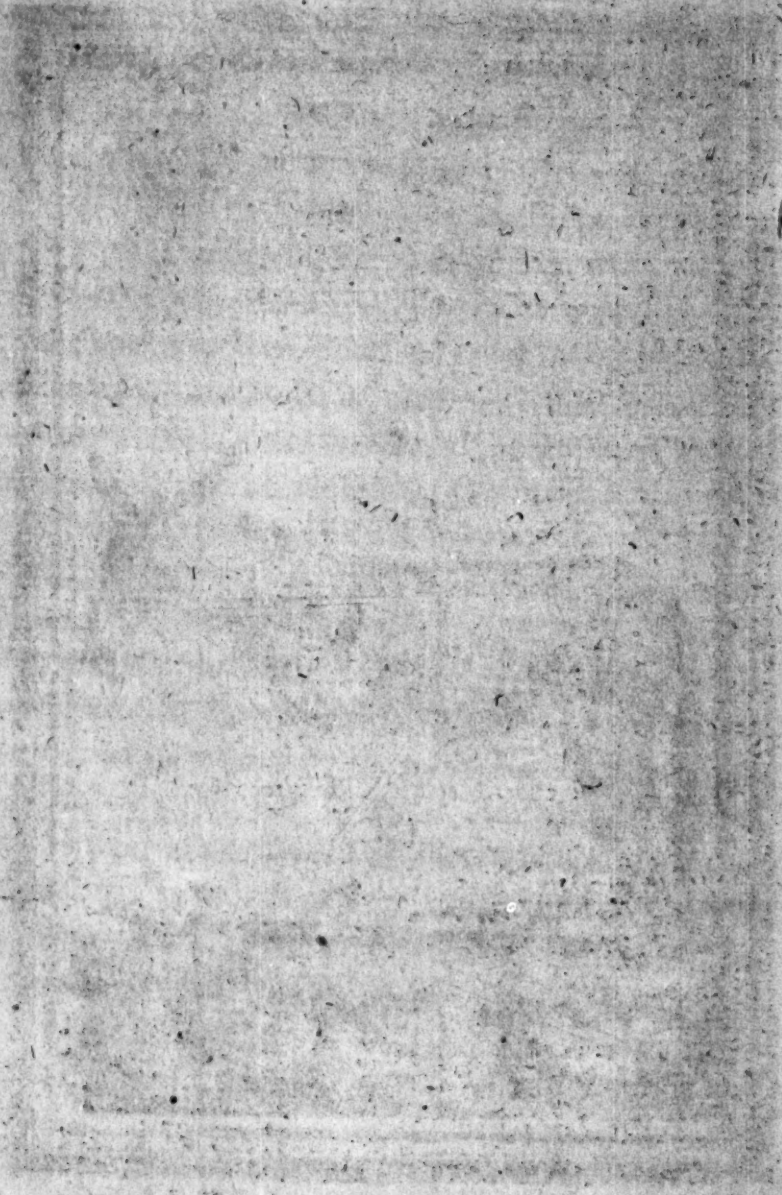
* Voyage de Thevenot, tom. 2. p. 64.

Plate XII.



Ass.

A. Bell sculpt



T H E O X .

THE surface of the earth, adorned with its verdure, is the common and inexhaustible source, from which man and other animals derive their subsistence. Every animated being in nature is nourished by vegetables; and these, in their turn, are supported by the spoils of all that has lived or vegetated. Destruction is necessary to life: It is only by the destruction of beings, that animals can live and multiply. God, when he

* The generic characters are: The horns bend out laterally; there are eight cutting teeth in the lower jaw, and none in the upper; the skin along the lower side of the neck is pendulous. The specific marks of the common bull and cow are, rounded horns, with a large space between their basis; Pennant's Synopf. p. 4.

Bos, Gesner, quad. 25. *Ran Syn. quad.* p. 70.

Ochs, Klein. quad. 9.

Bos cornibus levibus, teretibus, sursum reflexis; Brisson, quad. 52.

Bos taurus, cornibus teretibus extrorsum curvatis, palearibus laxis; Linn. Syst. 98.

N. B. The word *Ox*, in its common acceptation, denotes black cattle in general, without regard to sex. In a more restricted sense, it signifies a castrated bull. To prevent confusion, when, in the following article, *ox* is used in the last sense, it is printed in Italic characters.

he created the first individuals of each species of animal and vegetable, not only bestowed form on the dust of the earth, but gave it animation, by infusing into those individuals a greater or smaller quantity of active principles, of living organic particles, which are indestructible*, and common to every organized being. These particles pass from body to body, and are equally the causes of life, of the continuation of the species, of growth, and of nutrition. After the dissolution of the body, after it is reduced to ashes, those organic particles, upon which death has no influence, survive, circulate through the universe, pass into other beings, and produce life and nourishment. Hence, every production, every renovation or increase by means of generation, of nutrition, or of growth, implies a preceding destruction, a conversion of substance, a translation of organic particles, which never multiply, but, uniformly subsisting in equal numbers, render Nature always equally animated, the earth equally peopled, and equally resplendent with the original glory of that Being by whom it was created.

Taking beings in general, therefore, the total quantity of life remains always the same; and death, which seems to be an universal destroyer, annihilates no part of that primitive life which is common to all organized bodies. Like all
subordinate

* See Chap. VI. &c. of the second volume of this work.

subordinate powers, Death attacks individuals only. His blows are confined to the surface: He destroys the form, but has no influence on the matter. He is unable to injure Nature; his strokes, on the contrary, make her shine with additional lustre. She permits him not to annihilate the species, but allows him, successively, to mow down individuals, with a view to demonstrate her independence both of Death and of Time, to give her an opportunity of exerting, at every instant, her power, which is always active, and of manifesting the extent of her resources, by her fertility, and, by a perpetual renovation of beings, to make the universe a theatre always filled with objects which attract our attention by their grandeur and their novelty.

It is apparent, therefore, that a succession of beings cannot otherwise be effected than by mutual destruction. For the nourishment and subsistence of animals, vegetables or other animals must be sacrificed. And as, both before and after this destruction, the quantity of life remains always the same, Nature seems to be indifferent whether particular species be more or less consumed. Like an oeconomical parent, however, in the midst of fulness and affluence, she fixes limits to her expence, and prevents any unnecessary waste, by bestowing on few animals the instinct of feeding on flesh, while she has multiplied, profusely, both the species and the individuals.

viduals of those which live upon plants. In the vegetable kingdom, the seeds even to be prodigal of species, which are every where diffused, and endowed with an astonishing fecundity. Man, it is probable, has contributed not a little to promote the intentions of Nature, by maintaining, and even establishing, this order upon the earth; for, in the ocean, we actually perceive that indifference which we have supposed. Fishes of every kind are almost equally voracious. They live upon their own or different species, and perpetually devour each other, without annihilating any particular kind; because their fecundity is proportioned to the depredations they commit, and the whole consumption reverts to the advantage of reproduction.

Man knows how to exercise his power over animals. He selects those whose flesh is most agreeable to his palate, makes them his domestic slaves, and multiplies them far beyond what Nature would have done. By his industry in promoting their increase, he seems to have acquired a right to sacrifice them. But he extends this right farther than his necessities demand. He makes war against savage animals, birds, and fishes. He does not even limit himself to those of the climate he inhabits, but goes to foreign nations, and to the midst of the ocean, in quest of new luxuries. All Nature seems to be insufficient to satisfy the intemperance and caprice of his appetite. Man alone consumes more flesh than

than all the other carnivorous animals in the world. He is unquestionably the greatest destroyer; and he is so, more from abuse than necessity. Instead of enjoying, with moderation, the benefits presented to him, instead of dispensing them with equity, or making reparation in proportion to his waste, by renewing what he annihilates, the rich man places his chief glory in consuming at table more in one day than would be sufficient to feed many families. His abuse is not confined to the animals, but extends to his fellow-men, many of whom languish with famine and misery, and labour only to satiate the vanity and luxurious appetite of the opulent, who kill the poor by want, and put an end to their own existence by excess.

Man, notwithstanding, like some other animals, might live upon vegetables. Flesh, which appears so analogous to flesh, affords not better nourishment than grain or bread. That nutriment which contributes to the expansion, growth, and support of the body, consists not of the inert and visible matter of which the texture of flesh and of herbs is composed, but of the organic particles contained in both these substances; for the ox, in browsing the herbage, acquires as much flesh as man, or other animals, who live entirely on carnage and blood. There is but one difference between these two kinds of aliment: When the quantities are equal, flesh, corn, and seeds, contain a greater number of
organic

organic particles than herbage, of the leaves, roots, and other parts of plants. Of this fact we are ascertained by examining infusions of these substances: So that man, and the other carnivorous animals, whose stomachs and intestines are not so capacious as to admit a great deal of aliment at a time, are unable to devour herbage in quantities sufficient to afford the number of organic particles necessary for nourishing them. It is for this reason, that man, and the other animals who have but one stomach, can subsist only upon flesh and seeds, which contain, in a small volume, a great number of these organic nutritive particles: While the ox, and other ruminant animals, who have several stomachs, one of which is remarkably capacious, and, consequently, can admit a large quantity of herbage, are enabled to extract from this mass a number of organic particles sufficient for their nourishment, growth, and multiplication. Here the quantity compensates the quality of the nutriment. But the stock is the same. It is the same matter, the same organic particles, which nourish man, the ox, and all other animals.

It will be objected, that the horse has but one stomach, and a very small one; that the ass, the hare, and other animals which live upon herbs, have likewise but one stomach; and, consequently, that this theory, however probable, is not well founded. These apparent exceptions, however, so far from weakening, seem to confirm

firm the truth of it: For, though the horse and the ass have but one stomach, they have sacs or pouches in their intestines, so large, that they may be compared to the paunch of ruminant animals; and hares have a blind gut so long and wide, that it is equivalent, at least, to a second stomach. Thus, it is by no means surprising, that these animals are properly nourished by herbage alone: And, in general, it will always hold, that the different modes of feeding among animals depend on the total capacity of their stomach and intestines: For ruminating animals, as the ox, the sheep, the camel, &c. have four stomachs, and intestines of a prodigious length; and herbage alone is sufficient nourishment for them. Horses, asses, hares, rabbits, Guiney-pigs, &c. have only one stomach; but they have a blind gut equivalent to a second stomach; and they feed upon herbage and grain. The wild boar, the hedge-hog, the squirrel, &c. whose stomach and intestines are of a mean capacity, eat little herbage, but principally live upon seeds, fruits, and roots: And those animals which, in proportion to the size of their bodies, have small stomachs and intestines, as the wolf, the fox, the tiger, &c. are obliged to choose food of the most succulent kind, and which contains the greatest number of organic particles, and, of course, to live upon flesh, blood, seeds, and fruits.

It

It is obvious, therefore, that the diversity of tastes perceived in the appetites of different animals, arises not from the superior agreeableness of particular kinds of food to their palates, but from a physical cause necessarily depending on the structure of their bodies: For, if they were not oftener determined by necessity, than by taste, how could they devour corrupted carrion with equal avidity as fresh and succulent flesh? Why should they eat, without distinction, every species of flesh? We see, that domestic dogs, who have the liberty of making a choice, constantly refuse certain meats, as pork, woodcocks, thrushes, &c. But wild dogs, wolves, foxes, &c. eat, indiscriminately, the flesh of swine, woodcocks, birds of every kind, and even frogs; for I once found two frogs in the stomach of a wolf. When they can procure neither flesh nor fish, they eat fruits, seeds, grapes, &c. But they uniformly prefer those kinds of food which, in a small volume, contain a great quantity of nutriment, or rather of organic particles, proper for nourishing and supporting their bodies.

If these proofs should not appear to be sufficiently strong, let us attend to the manner of feeding cattle, when the object is to fatten them. They are first castrated, which obstructs the passage through which the greatest quantity of organic particles escape. Then, instead of allowing them to feed, as usual, on herbage alone, they are served with bran, corn, turnips, and, in a word,

word, with food more substantial than grass. The quantity of flesh, juices, and fat, soon augment; and, from a flesh naturally hard and dry, good and succulent meat is produced, which is used as the basis of our best dishes.

From what has been advanced, it is likewise a consequence, that man, whose stomach and intestines are proportionally of no great capacity, could not live upon herbage alone. It is an incontestible fact, however, that he can live pretty well upon bread, herbs, and the seeds of plants; for we know whole nations, and particular orders of men, who are prohibited by their religion from eating any animal substance. But these examples, though supported by the authority of Pythagoras, and recommended by some physicians, appear insufficient to convince us, that the health and multiplication of mankind would be improved by feeding solely upon pot-herbs and bread; especially when it is considered, that the country-people, whom the luxury and sumptuousness of the opulent reduce to this mode of living, languish and die much sooner than men of the middle rank of life, who are equally strangers to want and to excess.

Next to man, the carnivorous animals are the greatest destroyers. They are at once the enemies

* No food fattens cattle so successfully or so quickly as green herbage; but turnips, and the dry kinds of nourishment mentioned in the text, are used only in winter, when green vegetables cannot be procured in sufficient quantities.

mies of Nature and the rivals of the human kind. A constant attention, joined to the most indefatigable industry, are necessary to protect our flocks, poultry, &c. from birds of prey, and from the rapacious jaws of the wolf, fox, weasel, martin, &c. A perpetual war is requisite to defend even our grain, fruits, and garments, against the voracious attacks of rats, caterpillars, beetles, mites, &c.; for insects are to be ranked among those animals which are more destructive than useful. But the ox, the sheep, and other herbivorous animals, are not only the most precious and most useful to man, but they consume less, and are maintained at the smallest expence. With regard to this article, the excellence of the ox is superior to that of any other creature; for he restores to the earth as much as he takes from it: He even enriches and improves the ground on which he feeds. The horse, on the contrary, and most other animals, impoverish, in a few years, the best pasture-lands*.

But these are not the only advantages which man derives from the ox. Without the aid of this useful animal, both the poor and the opulent would find great difficulty in procuring subsistence; the earth would remain uncultivated; our fields and gardens would become parched and barren. All the labour of the country depends

* It were to be wished, that the author had supported this assertion by facts; for what he here advances, is not only doubtful, but probably altogether without foundation.

peaks upon him. He is the most advantageous domestic of the farmer. He is the very source and support of agriculture. Formerly the ox constituted the whole riches of mankind; and he is still the basis of the riches of nations, which subsist and flourish in proportion only to the cultivation of their lands and the number of their cattle: For in these all real wealth consists; every other kind, even gold and silver, being only fictitious representations, have no value, but what is conferred on them by the productions of the earth.

The form of the ox's back and loins show that he is not equally qualified for carrying burdens as the horse, the ass, or the camel. But the thickness of his neck, and broadness of shoulders, point him out as destined for the yoke. Though his chief strength lies in his shoulders, yet, in many provinces of France, they oblige him to draw by the horns. In support of this practice, it is alledged, that, when yoked in this manner, he is more easily managed. His head, I allow, is so very strong, that he may draw tolerably well by the horns; but still he would draw with much more advantage if yoked by the shoulders. Nature seems to have intended him for the plough. The largeness of his body, the slowness of his movements, the shortness of his legs, and even his tranquillity and patience under labour, concur in rendering him superior to every other animal for cultivating the ground, and o-

vercoming that constant resistance which the earth opposes to his efforts. The horse, though perhaps equal in strength, is not so well-fitted for this kind of labour. His limbs are too long, and his motions too sudden and violent. Besides, he is impatient, and easily disheartened *. When employed in this heavy work, which requires more perseverance than ardour, more force than quickness, and more weight than spring, we rob the horse of all the nimbleness of his motions, and all the graces of his gait and attitudes.

Of those animals which man forms into flocks, and whose multiplication is his principal object, the females are more useful than the males. The produce of the cow is almost perpetually renewed. The flesh of the calf is equally wholesome and delicate; the milk is an excellent food, especially for children; butter is used in most of our dishes; and cheese is the principal nourishment of our peasants. How many poor families are reduced to the necessity of living entirely on their cow? Those very men, who toil from morning to night, who groan and are bowed down with the labour of ploughing the ground, obtain nothing from the earth but black bread, and

* The horse, when properly trained, is equally firm and steady at a constant draught as the ox, and much more capable of an extraordinary exertion, when that becomes necessary. This quality gives him an evident superiority over the ox; because it renders it unnecessary for the farmer to keep supernumerary cattle for the sole purpose of overcoming any violent resistance that may occur,

and are obliged to yield to others the flour and substantial part of the grain. They raise rich crops, but not for themselves. Those men who breed and multiply our cattle, who spend their whole lives in rearing and guarding them from injuries, are debarred from enjoying the fruits of their labour. They are denied the use of flesh, and obliged, by their condition, or rather by the cruelty of the opulent, to live, like horses, upon barley, oats, coarse pot-herbs, &c.

The cow may likewise be used in ploughing; and, though her strength is not equal to that of the ox, she frequently supplies his place. But, when employed in this way, she should be matched, as nearly as possible, with an ox of the same stature and strength, or with another cow, in order to maintain the equality of the draught, and to keep the plough in equilibrium between the two forces, which facilitates the labour, and makes the furrows more regular. From six to eight oxen are often employed in stiff land, and particularly in rough fallow-grounds, which rise in large masses. But two cows are sufficient for light soils; and, in very light land, the length of the furrow drawn at once may be farther extended. The antients limited the length of the furrow, to be drawn without any interruption in the motion of the cattle, to 120 paces; after which they were allowed to stop, for a few moments, to recover their breath, before going on with the same furrow, or beginning a
new

new one. But the antients delighted in the study of agriculture, and gloried in ploughing themselves, or at least in encouraging their labourers, and rendering both them and the cattle as easy as possible. Among the moderns, however, those who enjoy the most luxurious productions of the earth, are least acquainted with the means of encouraging or supporting the arts of cultivation.

Propagation is the principal use of the bull. Though he may likewise be trained to labour; yet his obedience is uncertain, and it is always necessary to guard against the improper exertions of his strength. Nature has endowed the bull with a bold and untractable disposition. In the rutting season, he becomes perfectly ungovernable, and often furious. But castration, while it destroys the source of these impetuous emotions, diminishes not his strength. On the contrary, it makes him larger, heavier, and more fit for the labour to which he is destined. It also changes his dispositions; for, after this operation, he becomes more tractable, more patient, and less troublesome to his neighbours. A flock of bulls would exhibit a scene of the most frightful discord; they could neither be intimidated nor conducted by man.

The manner of performing castration is well known to the country-people. Different modes; however, are practised, and their effects are perhaps not properly attended to. In general, the
time

time most proper for castration, is that which immediately precedes puberty, which happens at the age of 18 months or two years. When performed more early, the animals seldom survive*. However, when young calves are castrated soon after birth, and survive an operation so dangerous at that period of life, they become larger and fatter *oxen*, than if it had been delayed till the second, third, or fourth year. But, in the latter case, they preserve more of their natural activity and courage: And, when delayed till the sixth, seventh, or eighth year, the animals hardly lose any of the qualities peculiar to the male sex. They are more impetuous and untractable than other *oxen*; and, in the season of love, they are apt to harass the females, from whom they should be carefully separated: For copulation, or even contact with *oxen*, produces warty tumors on the parts of the cow, which it is necessary to remove with the actual cautery. This disease † is supposed to proceed from a certain purulent and corrosive matter ejected from *oxen*, which have either been castrated, or had their testes twisted and compressed, with a view to destroy their power of generating.

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* Here our author's usual accuracy seems to have forsaken him. It is a certain and well known fact, that, when castration is performed at the age of eight or ten days, not one in twenty dies, in proportion to the number of those which perish, when the operation is delayed to the age of puberty.

† This disease was never heard of, as far as I can learn, in Britain.

The females generally come in season in the spring; and, in France, most of them receive the bull and are impregnated from the 15th of April to the 15th of July; but some are earlier and others later. Their time of gestation is nine months; and they bring forth in the beginning of the tenth. Hence our calves are numerous from the 15th of January to the 15th of April. They are also plenty during the whole summer, and become more rare in autumn. The marks of ardour in the cow are not equivocal. She then lows more frequently and with more violence than at any other time. She mounts upon cows, *oxen*, and even upon the bull. The external parts swell, and become prominent. When her ardour is greatest, she ought to be gratified; for, if allowed to abate, she is apt not to retain.

The bull, like the stallion, should be chosen from the handsomest of his kind. He should be large, well made, and in good condition as to fatness. His eyes should be black, his aspect bold, his front open, his head short, his horns thick, short, and black, his ears long and bushy, his muzzle large, his nose short and straight, his neck fleshy and thick, his chest and shoulders large, his loins firm, his back straight, his legs thick and fleshy, his tail long and well covered with hair, his tread firm and sure, and his hair of a reddish colour *. Cows often hold at the first, second, or third time; and, as soon as they

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* La Nouvelle maison rustique, tom. 1. p. 298.

are impregnated, though the symptoms of ardour still appear, the bull refuses to cover them: But, in general, their ardour ceases immediately after conception, and they spontaneously repel the approaches of the bull.

Cows with young, when improperly managed, or put to the plough, carriage, &c. are subject to abortion; they should, therefore, be carefully watched and attended, to prevent them from leaping hedges or ditches. They should also be fed on rich pasture, and in parks which are not too moist or marshy. Six weeks, or two months, before bringing forth, their ordinary quantity of food should be enlarged*, by putting grass into their stalls in summer, and, in winter, by giving them bran, lucern, saintfoine, &c. From this period, no milk should be drawn from them, the whole of it being necessary for nourishing the foetus. In some cows, the milk dries up entirely a month or six weeks before they bring forth; but those which have milk to the last, make the best mothers and the best nurses. This late milk, however, is commonly bad, and in small quantity. The delivery of the cow requires still more attention than that of the mare; for the former is weaker and more exhausted by the operation. She ought to be put into a stable, to

* The practice in this country is directly the reverse of that here recommended. When in good order, cows are more sparingly fed some time before they bring forth; because the opposite management is supposed to make the calf grow too large, and, of course, to endanger the life of the mother.

to have good litter, and to be fed, for ten or twelve days, with bean-flour, or oats, diluted in salted water, and plenty of lucern, saintfoine, or good grass *. This time is generally sufficient for the recovery of her strength; after which she may gradually return to her usual mode of living and pasturing. During the first two months, her milk, which is then not good, should be solely appropriated to the nourishment of the calf.

That the calf may be kept warm, and suck as often as it chooses, it should be allowed to remain constantly with the mother for the first five or six days. After this period, the calf, if always left with the mother, would exhaust her by sucking too much. It is sufficient to let calves suck twice or thrice a-day; and, to improve their flesh and fatten them quickly, they should every day be fed with raw eggs, boiled milk, and bread. At the end of four or five weeks, calves managed in this manner are fit for the butcher. When designed for the market, they may be allowed to suck only 30 or 40 days †. But those which are intended to be brought up, should

* For some days after calving, our cows are generally prevented from eating green succulent food. They are preserved from cold; and tepid water, mixed with oat-meal, or some other palatable substance, is given them to drink.

† If this be the practice in France, the veal must be bad. Calves destined for the market, should be fatted at least eight or ten weeks, otherwise the veal cannot acquire its full perfection. Neither is it usual, in cultivated countries, to allow the calves to suck; for the milk is given them by the hand.

should have suck two months at least; for the longer they are allowed to suck, they become the larger and stronger cattle. Calves brought forth in the months of April, May, and June, are best for raising; those that come later into the world, being unable to resist the rigour of winter, generally languish and die with cold. At the end of two, three, or four months, and before weaning them entirely, they should be fed with good grass or tender hay, to accustom them gradually to their future nourishment. They should then be separated from the mother, and never again be permitted to approach her either in the stable or the field. In summer, they should be pastured every day from morning to night. But, as soon as the cold commences in autumn, they should be turned out to pasture late in the morning, and brought back to the stable early in the evening: And, during winter, as cold is extremely hurtful to them, they should be kept warm in a close well littered stable. Along with their usual food, they should have saintfoin, lucerne, &c. and never be allowed to go out, excepting in soft weather*. During the first winter, which is the most dangerous period of their existence, they require a great deal of attention. In the succeeding summer, they acquire strength sufficient

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* Young cattle should be allowed to go abroad every day, unless the weather be extremely tempestuous. It preserves them in the habit of using their limbs, makes their blood circulate with more freedom, and excites their appetite.

cient to fortify them against the attacks of the second winter.

The cow arrives at the age of puberty in eighteen months, and the bull in two years*. But, though they are then capable of generating, they should not be admitted to each other till they be three years old. From three to nine years, these animals are in their greatest vigour. After this period, both cows and bulls are only fit for being fattened and delivered to the butcher. As they acquire their full growth in two years, the duration of their life, like that of most other animals, is nearly seven times two, or fourteen years, few of them ever exceeding this age.

In all quadrupeds, without exception, the voice of the male is stronger and deeper than that of the female. Though the ancients alledge, that the cow, the ox, and even the calf, have deeper voices than the bull; yet the contrary is certain; for the voice of the bull reaches much farther. The bellowing of the bull not being a simple sound, but composed of two or three octaves, the highest of which strikes the ear most forcibly, may have given rise to this deception: But, when we listen attentively, we perceive, at the same time, a sound much graver than is uttered by the cow, the ox, or the calf, whose lowings are also a great deal shorter. The bull never bellows, but when stimulated by love; the lowings

* In this country, cows and bulls are capable of procreating at a much earlier period,

ings of the cow proceed oftener from terror or timidity, than from any other cause; and pain, hunger, or the absence of the mother, produce the complaints of the calf.

The heaviest and most sluggish animals are not those which sleep longest or most profoundly. The slumbers of the ox are slight and short. The slightest noise rouses him. He lies commonly on the left side; and the left kidney is always larger and fatter than the right.

The ox, like other domestic animals, varies in colour. The reddish colour, however, is most common, and in highest estimation. Some praise the black colour; and others maintain, that bay oxen live longest; that the brown soon decay and lose their spirit; and that the gray, the dappled, and the white, are of no value for the purposes of labour, and should only be fattened for slaughter. But, whatever be the colour of an ox, his coat ought to be smooth, shining, thick, and soft to the touch; for, when rough and unequal, it indicates bad health, or a weak constitution. A good ox for the plough should neither be too fat nor too lean; his head ought to be short, his ears large and well covered with hair, his horns strong, shining, and middle-sized, his fore-head broad, his eyes large and black, his muzzle thick and flat, his nostrils wide, his teeth white and even, his lips black, his neck fleshy and strong, his shoulders thick and massy, his chest large, his dewlap long, and extending as far as his

his knees, his loins very broad, his belly wide and prominent, his flanks large, his haunches long, his crupper thick, his legs and thighs large and nervous, his back straight and plump, his tail as long as to reach the ground, and covered with fine bushy hair, his feet firm, his skin thick and pliable *, his muscles well raised, and his toes or hoofs broad and short †. He should likewise feel the goad with sensibility, obey the call of his driver, and be well-trained. But it is only by degrees, and by beginning at an early period, that the ox can be taught patiently to bear the yoke, and to allow himself to be conducted with ease. At the age of two and a half, or three years at most, we should begin to tame and accustom him to the yoke. If longer delayed, he often becomes perfectly ungovernable. Patience, mildness, and even caresses, are the only means which should be employed. Force and harsh treatment serve no other purpose than to dispirit and render him totally unmanageable. He should be stroked and caressed; and he should occasionally be fed with boiled barley, bruised beans, and other aliments of the same kind, mixed with a little salt, of all which he is extremely fond. His horns, at the same time, should be frequently tied. Some days

* La nouvelle maison rustique, tom. 1. p. 279.

† These marks are at present out of fashion in Britain, and not to be depended on. Every nation, every province, has its own favourite marks; but most of them are temporary and fluctuating.

days afterwards, he may be yoked to the plough along with another ox of the same stature, which has been previously trained. They should be tied up together at the manger, and led to the same pasture, in order to make them thoroughly acquainted, and acquire the habit of having always the same movements. At first the goad should never be used; for it contributes to render them untractable. He should be forced to work only a little at a time; for, when not thoroughly broke, he is soon fatigued. For the same reason, he should be fed more plentifully than usual.

The ox ought to labour only from three to ten years; for, when he works till he be farther advanced in years, the quality of the beef is injured. The age of this animal is known by his teeth and horns. The middlemost fore-teeth fall out when he is ten months old, and are replaced by others which are broader, but not so white. At the age of sixteen months, those next to the former shed, and are succeeded by others. At the age of four years, the whole cutting teeth are renewed; and they are then even, long, and pretty white. In proportion as the ox advances in years, these teeth wear and become black and unequal. The same thing happens to the bull and cow. Thus neither sex nor castration have any influence on the growth or shedding of the teeth. Neither do these circumstances produce any alteration in the casting of the horns; for,
at

at the age of three years, the bull, cow, and ox, shed their horns*, which are replaced by others, and which, like the second teeth, never fall off. The horns of the ox and cow are longer and thinner than those of the bull. The growth of the second horns is not uniform. The first year, which is the fourth of the animal's age, two neat pointed horns, terminated near the head by a kind of ring, arise. In the following year, this ring mounts farther from the head, being pushed forward by a new horny cylinder, which is likewise terminated by another ring, and so on; for the horns continue to grow as long as the animal lives. These rings are very apparent; and, by their number, the ox's age may be easily counted, by adding three years to the number of intervals between the rings.

The horse eats slowly, but almost perpetually. The ox, on the contrary, eats fast, and fills his stomach in a very short time; after which, he lies down to ruminate. This difference in eating, proceeds from the different conformation of their stomachs. The ox, whose two first stomachs consist of but one large bag, can, without incon-

* Black cattle, it is well known, never do shed their horns. It is astonishing that our learned author should have been betrayed into this blunder, and still more astonishing that it should be repeated in the last Paris edition, in 1786. The rings he mentions do, indeed, begin to appear at this period, and continue to increase, with some regularity, as long as the animal lives.

inconveniency, quickly throw in a great quantity of herbage, which, by means of chewing the cud, he digests at leisure. But the stomach of the horse, which is single and small, can only receive a small quantity of food; and he therefore, fills it gradually, in proportion as the herbage dissolves, and passes into the intestines, where the decomposition of the aliment is chiefly effected. Having examined, in the ox and horse, the successive product of digestion, particularly in the decomposition of hay, I remarked, in the ox, that, when the aliment was passing into that part of the paunch which forms the second stomach, it was reduced to a kind of green paste, resembling boiled spinach; that, under this form, it is retained in the folds of the third stomach; that the decomposition is completed in the fourth stomach; and that hardly any thing passes into the intestines, excepting faeces or drags. But, in the horse, the hay is not decomposed, either in the stomach or first portions of the intestines, where it only becomes more soft and pliable, being macerated by the liquor which surrounds it. With very little alteration, it arrives at the caecum and colon. It is chiefly in these two intestines, whose extraordinary capacity corresponds with that of the paunch of ruminant animals, that the food of horses is decomposed. But the decomposition is never so complete, as that which is effected in the fourth stomach of the ox.

For

For these reasons, and even from inspecting the parts, it is easy to conceive how rumination is performed, and why the horse neither ruminates nor vomits. Rumination is only a vomiting without much effort, occasioned by the reaction of the first stomach upon its contents. The ox completely fills his two first stomachs, or portions of the paunch. This membrane, when distended, re-acts with great force on the food it contains, which is very little cut by chewing, and whose volume is greatly augmented by fermentation. If the aliment were liquid, this contracting force would make it pass into the third stomach, which communicates with the other by a narrow canal, whose orifice is situated in the superior part of the first, and nearly as high as that of the gullet. Hence this canal can only admit the food, after it is reduced to a more fluid form. The drier parts must, therefore, rise into the gullet, the orifice of which exceeds that of the canal. When the food comes back into the mouth, the animal chews it again, and macerates it with a fresh quantity of saliva, which gradually liquifies it to such a degree, as enables it to pass through the canal into the third stomach, where it is still farther diluted before it enters the fourth. It is in this last stomach that the hay, which is there reduced to a perfect mucilage, is completely decomposed. To confirm the truth of this explanation, it may be remarked, that, as long as these animals suck, or are

are nourished with milk, and other liquid aliments, they never ruminate; and that, in winter, when they are fed with dry aliment, they ruminate much oftener than during summer, when the grass is tender and succulent. The stomach of the horse, on the contrary, is small; the orifice of the oesophagus is narrow, and that of the pylorus very large. These circumstances alone render rumination impracticable; for the food contained in this small stomach, though perhaps it suffers a greater compression than from the stomach of the ox, cannot mount upwards; because it descends with greater ease through the pylorus, which is much wider than the gullet. To pass through the pylorus, it is not even necessary that the hay be reduced to a soft mass; for the contracting force of the stomach is capable of pushing it through, when almost dry. This difference of structure, therefore, enables the ox to ruminate, and prevents the horse from performing that function. But there is another singularity in the horse, which absolutely prevents him from vomiting, and, consequently, from chewing the cud. The alimentary canal, by coming in a very winding direction into the stomach, the coats of which are exceedingly thick, makes a gutter in piercing them, so oblique, that, instead of being opened by the convulsive motions of the stomach, they only serve to shut it the closer. Though this, as well as other differences of structure observable in the

bodies of these two animals, are derived from Nature, because they are invariably the same; yet, in the development of the soft parts particularly, there are differences apparently constant, which, nevertheless, may, and often are varied by particular circumstances. The great capacity of the ox's paunch, for example, is not solely a production of Nature. Its original conformation, on the contrary, is varied, and its capacity gradually enlarged, by the fermentation and great volume of the aliments it receives: For, in a calf that has never eat grass, though not very young, the paunch is proportionally much less than in the adult. Hence this uncommon capaciousness of the paunch proceeds from the extension occasioned by the great mass of aliment daily devoured. Of this I was convinced by an experiment, which appears to be decisive. I fed two lambs, of equal ages, and weaned, at the same time, the one with bread, and the other with grass. At the end of twelve months, when both were opened, I found that the paunch of the latter was much larger than that of the former.

It is alledged, that *oxen* which eat slowly, support labour longer than those that eat quickly; that the *oxen* of dry and elevated countries are more active, vigorous, and healthful, than those which are fed in low moist grounds; that they are stronger when fed with dry hay than with soft grass; that they are more difficultly habi-

tuated

suited to a change of climate than horses; and, for this reason, that oxen designed for labour ought never to be brought from any great distance.

As the oxen are idle in winter*, they may be fed with straw and a little hay. But, in the labouring season, they should have more hay than straw, and even a little bran or oats. In winter, if the hay be scarce, they should be fed with cut grass, or rather with the young shoots and leaves of the ash, elm, oak, &c. But of these last they should be allowed only small quantities; because indulgence in this kind of food, of which they are exceedingly fond, sometimes occasions a bloody urine. Lucerne, saintfoine, vetches, whether green or dry, lupins, turnips, boiled barley, &c. afford them excellent nourishment; and, as they never use more than is necessary, they should always have as much as they will take. They should not be permitted to pasture till the middle of May; because young herbage is too crude for them; and, though they eat it with avidity, it sometimes makes them uneasy. They should be pastured during the whole summer, and, about the middle of October,

* Are we from this to conclude, that the oxen in France labour none during the winter? We should rather imagine that winter is the most busy season for ploughing there, as well as in Britain, unless in districts where the soil consists of very strong clay, &c.

October, they should be brought back to the stall, always taking care not to make their changes from green food to dry, or from dry to green, too rapid, but to accustom them gradually to these different kinds of aliment.

Great heat is perhaps more hurtful to those animals than great cold. During summer, they should be set to work very early in the morning, put into the stable, or left to graze under the shade of trees, in the middle of the day, and not yoked again till three or four o'clock after noon. In spring, autumn, and winter, they may be wrought, without interruption, from eight or nine in the morning to five or six in the evening. Though they require not so much attention as the horse; yet, to keep them vigorous and healthful, they should be daily curried and washed; their hoofs should likewise be rubbed over with grease. They should also have drink, at least twice a day. Though the horse loves muddy and lukewarm water, the ox always prefers that which is fresh and clean.

Though the cow, in general, requires the same food and management as the ox; yet, the milk-cow demands particular attention, both in the choice and treatment of her. It is said, that black cows give the best milk; and that white cows furnish the greatest quantity of it. But, whatever be the colour of a milk-cow, she ought to be plump, to have lively eyes, and a lightness in her motions. She should likewise be
young,

young, and give plenty of good milk. In summer, she should be milked twice a day, and only once in winter; and, when an increase in the quantity of milk is required, she ought to have more succulent food than herbage.

Good milk is neither too thick nor too thin. Its consistence should be such, that a small drop ought to preserve its spherical figure, without running. It should also be very white; when of a yellowish or bluish colour, it is of no value. Its taste should be sweet, without any degree of bitterness or sharpness. Its flavour should be agreeable. In the month of May, and during the summer, milk is better than in winter; and it is never perfectly good, but when the cow is of a proper age, and in good health. The milk of young heifers is too thin, and that of old cows is too dry, and too thick, especially in winter. These different qualities of milk are proportioned to the quantities of oily, caseous, and serous particles it contains. Thin milk has too great a quantity of serous particles; too thick milk has the opposite quality; and milk that is too dry, has not enough of the oily and serous particles. The milk of a cow in season, or when near the end of gestation, or soon after delivery, is bad. In the third and fourth stomachs of a sucking calf, there are clots of curdled milk, which, after being dried in the air, become runner,

* It is a better practice to milk cows three times a day in summer, and twice in winter.

runnet, or that well known substance which coagulates milk. The longer the runnet is kept, its strength increases, and a small quantity of it is sufficient to make a great deal of cheese.

Both cows and *oxen* are fond of wine, vinegar, and salt; and they devour a dressed salad with great avidity. In Spain, and some other countries, they put one of those salt stones, called *salagres*, and which are found in the salt-mines, near the young calves in the stable. They lick this stone during the time their mothers are pasturing, which excites their appetite, or creates thirst to such a degree, that, when the mothers return, the calves suck greedily, and, by this means, they grow and fatten much sooner than those to whom no salt is given. For the same reason, when *oxen* lose their appetite, they are served with grass drenched in vinegar, or sprinkled with salt. To make them fatten quickly, salt, as it increases their appetite, may also be administered. It is common to begin to fatten them at the age of ten years. If longer delayed, success is not so certain, neither is their flesh equally good. They may be fattened in all seasons; but summer is preferable, because less expence is incurred; and, by beginning in May or June, they are fit for the butcher before the end of October. Whenever we begin to fatten *oxen*, they should no longer be allowed to labour. They ought to drink frequently, to have plenty of succulent food, sometimes mixed with

with a little salt; and they should be permitted to ruminate and sleep in the stable during the heat of the day. By this treatment, in four or five months, they will be so fat as to be hardly able to walk, or be conducted to any distance but by very short journeys. Cows, and even bulls whose testicles have been twisted, [*testes tortus*], may also be fattened. But the flesh of the cow is drier than that of the ox; and the flesh of the bull, even when maimed, is red, hard, and has a strong disagreeable taste. Bulls, cows, and oxen, are fond of licking themselves, especially when lying at their ease. To prevent this practice, which is supposed to retard their fattening, it is common to besmear every part of the body they can reach with their own dung*. If this precaution be neglected, they swallow great quantities of hair, which, being an indigestible substance, remains in the stomach, and forms a kind of balls, called *argagropilae*, of a size so considerable as to hurt the powers of digestion. These balls, in process of time, are covered with a brown crust, which, though formed of mucilage, becomes hard and polished. They are only found in the maw; and, if any hairs enter into the other stomachs, or bowels, they are probably discharged along with the faeces.

Animals

* This precaution is unnecessary; for the disorder mentioned in the text is extremely rare. Besides, it is a common notion, that licking promotes the health of cattle. It is certain, however, that licking is a mark of their beginning to get into flesh.

Animals which, like the horse and ass, have cutting teeth in both jaws, browse short grass with more ease than those that want these teeth in the upper jaw. The sheep and goat, indeed, cut very close, because they are small animals, and have thin lips. But the ox, whose lips are thick, can only eat long grass. It is for this reason that he does no injury to the pasture on which he feeds. As he only bites off the extremities of young herbage, the roots are not disturbed, and the growth is very little retarded. The sheep and goat, on the contrary, cut the plants so close to the ground, that the stems are destroyed and the roots spoiled. Besides, the horse always selects the shortest and most tender, allowing that which is longer and harder to ripen and shed the seeds. But the ox devours all the large stems, and gradually destroys the coarser kinds of grass. Hence, in a few years, grass pastured by the horse degenerates, while the ox always improves the herbage on which he feeds.*

The domestic ox, which ought not to be confounded with the urus, the buffalo, or the bison, seems to be a native of our temperate climates; excessive heat or excessive cold being equally hurtful

* This reasoning has by no means the sanction of experience. Fields pastured by horses or sheep degenerate as little as those pastured by black cattle. Besides, the roots of many of the finest grasses are perennial, and thrive best when close browsed; and some of the best grasses grow pretty tall, and some of the worst kinds never rise high.

hurtful to him. Besides, this species, so abundantly diffused over all Europe, is not found in the equatorial regions, and extends not, in Asia, beyond Armenia and Persia, nor, in Africa, beyond Egypt and Barbary. For, in India, the southern parts of Africa, and even in America, their native cattle are either bisons, which have a protuberance on their backs, or other animals of a different species, to whom travellers have given the name of oxen. Those found at the Cape of Good Hope, and in many parts of America, were transported thither from Europe by the Dutch and Spaniards. In general, countries which are somewhat cold, seem to be more agreeable to our oxen than warm climates. They are likewise larger and taller in proportion to the moistness of the climate, and the richness of the pasture. The largest oxen are those of Denmark, Podolia, the Ukraine, and Calmuck Tartary†. Those of Britain, Ireland, Holland, and Hungary, are larger than those of Persia, Turkey, Greece, Italy, France, and Spain; and the Barbary oxen are the most diminutive. The Dutch, I am assured, bring annually from Denmark a great number of large meagre cows, which give more milk than those of France. The milch-cows, called *Latb-backs*, which are numerous in Poitou, Aunis, and the fens of Charpente, have probably been derived

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† Voyage de Reynard, tom. 1. p. 217. and l'Hist. gen. des voyages, tom. 7. p. 13.

from this race; for they are larger, leaner, and yield more milk and butter than the common kind. They may be milked during the whole year, excepting four or five days before they bring forth; but they require excellent pasture. Though they eat not more than ordinary cows, as they continue always meagre, all their superfluous nourishment is converted into milk. But, whenever ordinary cows feed for some time in rich pastures, they become fat, and cease to give milk. With a bull of this race, and common cows, a bastard kind is produced, which is more fertile in milk than the ordinary race. This bastard race frequently bring forth two calves at a birth, and likewise give milk during the whole year. Cows form a part of the riches of Holland, from which considerable quantities of butter and cheese are annually exported. The Dutch cows give twice as much milk as the French cows, and six times more than those of Barbary*.

In Ireland, Britain, Holland, Switzerland, and other northern countries, great quantities of beef are salted and smoked, both for the purposes of trade, and for the use of the navy. These countries also export a prodigious number of hides. The skin of the ox, and even of the calf, are used for many purposes. The grease is likewise a substance of great utility. The dung of the ox is the best manure for dry and light soils.

* See Shaw's Travels.

soils. The horn of this animal afforded to men the first instrument for drinking, for augmenting sounds, for introducing light into houses, and for making lanthorns. It is now moulded into boxes, combs, spoons, and other articles of manufacture. But I must conclude; for Natural history ends where the history of arts commences.

S U P P L E M E N T.

IN Tartary and Siberia, the oxen are extremely numerous. At Tobolski there are also vast quantities of black cattle *. I formerly mentioned, that, in Ireland, both the *oxen* and cows frequently want horns: But this happens only in the southern parts of the island, and in some maritime places, where the grass is either scarce, or of a bad quality; which is an additional proof, that the horns are produced by redundant nourishment †. In places adjacent to the sea, the Irish

* Hist. gen. des voyages, tom. 18. p. 119.

† The want of horns is here ascribed to a deficiency of redundant nourishment. In many places, there are few cattle but those which have no horns, and they are equally fat, and yield as much milk as any other kind, when fed in the same pastures. The truth is, this is a distinct breed, and may be perpetuated in any climate or soil where cattle can live, if all commixture with other kinds be prevented.

There

Irish feed their cows with fish boiled into a kind of pap: these animals are not only accustomed to this kind of food, but they are very fond of it; and, it is said, their milk is not affected with any disagreeable smell or taste*.

The cows and oxen of Norway are, in general, very small. In the islands along the Norwegian coast, they are somewhat larger. This difference must proceed from better pasture, and from their being allowed, in these islands, to live without restraint; for they are left at absolute liberty, with no other guides than being accompanied, in winter, with a few rams, which are accustomed to scrape the snow from the ground, and to uncover the grass both for themselves and the other cattle. Here they often become so ferocious, that they can only be taken by means of ropes. These half-wild cows give very little milk. When pasture is scarce, they eat sea-weeds, mixed with boiled fish †.

The European cattle have multiplied so prodigiously in South America, that, at Buenos-aires, and some degrees beyond it, no man thinks of appropriating them. The hunters kill thousands of them solely for the sake of their
hides

There is another variety of the ox tribe, that is not taken notice of by our author. They have short horns, which adhere not to the skull, but hang down on the forehead, to which they are connected only by a loose skinny ligament. In some places, they are called *Scurred cattle*, and continue their kind, if not allowed to intermix with other breeds.

* Hist. gen. des voyag. tom. 18. p. 19.

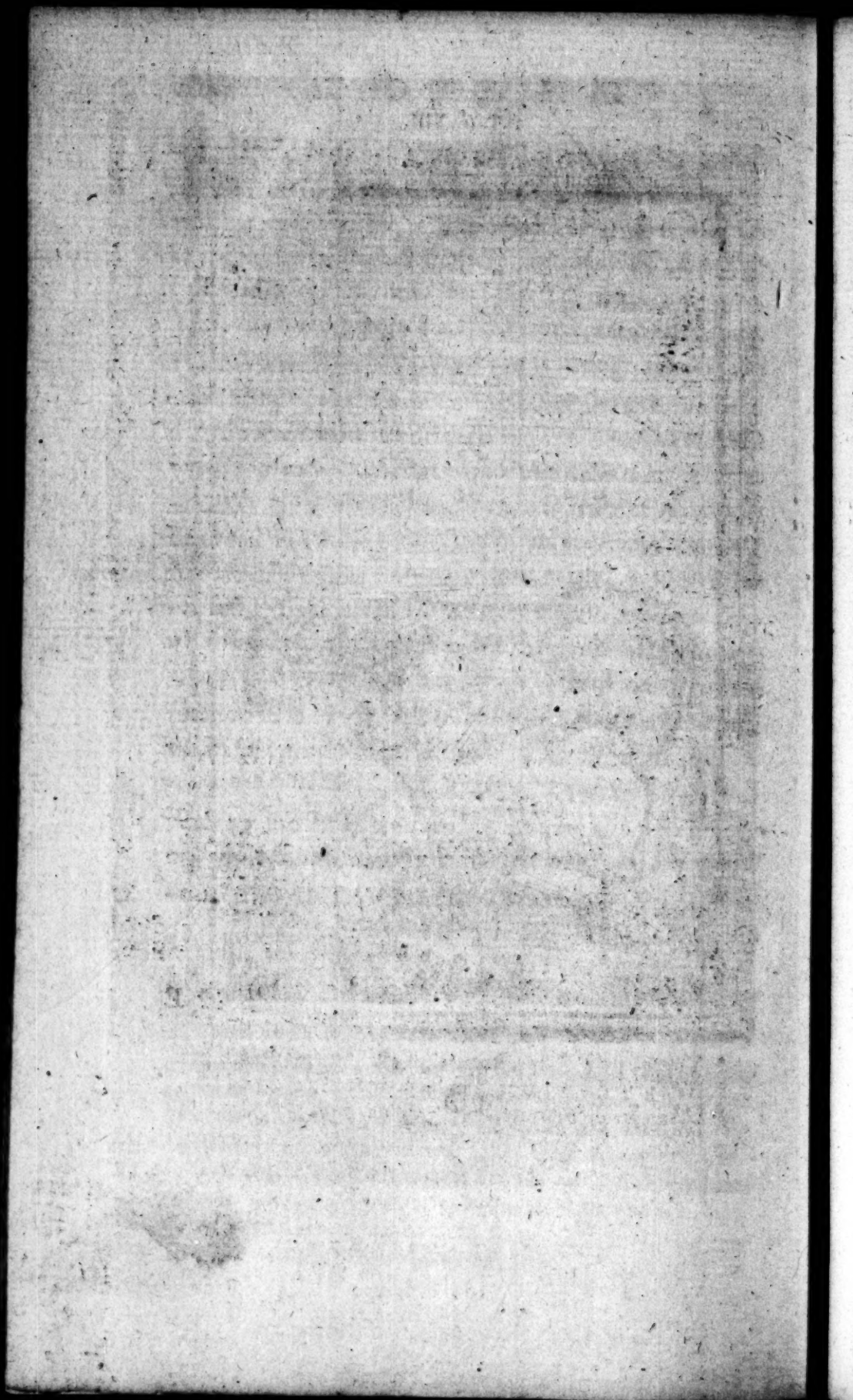
† Pontoppidan's Nat. hist. of Norway.

Plate XIII



A. Bullen del.

BULL.



hides and tallow. They are hunted on horse-back, and their pursuers either hamstring them, or take them in toils made of strong leather straps*. In the island of Saint-Catharine, upon the coast of Brazil, there are a few small oxen, whose flesh is flabby and disagreeable to the taste. Both these defects are occasioned by bad nourishment; for, as they have little pasture, they are chiefly fed upon wild gourdst.

In some countries of Africa, oxen are very numerous. Between Cape Blanc and Sierra-Leona, the woods and mountains are covered with wild cows, which are generally of a brown colour, with sharp, black horns. They multiply so fast, that, if they were not perpetually hunted, both by Europeans and Negroes, their number would be infinite†. In the provinces of Duguela, and Tremecen, and other parts of Barbary, as well as in the deserts of Numidia, there are wild cows of a dark chesnut colour. They are very small, but nimble, and they go in flocks, sometimes to the number of two hundred||.

THE

* Voyage du P. Lope, tom. 1. p. 38.

† Ibid.

‡ Hist. gen. des voyages, tom. 3. p. 291.

|| L'Afrique de Marmol, tom. 3. p. 66. 157.

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T H E S H E E P, and their skins either tanned or
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on the coast of Brazil, there are a few small
T H A T all domestic animals originally ex-
 isted in a wild or savage state, seems to be
 an incontestible fact: The history of those al-
 ready given furnishes ample proof of this posi-
 tion; for we still find horses, asses, and bulls,
 living totally independent of the human race.
 Can man, who has subjected so many millions
 of individuals, boast of having conquered and
 enslaved an entire species? As all animals were
 created without his aid, is it not reasonable to
 suppose, that Nature bestowed on them the fa-
 culty of existing and of multiplying without his
 assistance? If, however, we attend to the weak-
 ness and stupidity of the sheep; if we consider,
 that this helpless animal is even unable to save
 himself by flight; that all the carnivorous ani-
 mals are not only his mortal enemies, but prefer
 him to every other prey; that the species are
 not very fertile; that the life of individuals is
 short, &c. we would be tempted to think, that
 the

* The horns of the common sheep are twisted spirally and
 pointed outwards: There are eight cutting teeth in the lower
 jaw, and none in the upper; and the hoofs are cloven. *Pen-*
nant, Synopf. p. 10.

Ovis aries, cornibus compressis lunatis; *Linn. Syst. nat. 57.*
Ovis Plinii, lib. 8. c. 47. *Gesner. quad. 771. Raii Syn.*
quad. 73.

Widdor Schaaf, Klein. quad. 13.

Aries laniger, cauda rotunda brevi; *Briffon. quad. 48.*

the sheep was originally committed to the protection and guardianship of man, and that, without his aid, this animal could neither subsist nor multiply, especially as no wild sheep have ever been found in the deserts. Wherever man has not the dominion, the lion, the tiger, and the wolf, reign by the laws of force and of cruelty. These sanguinary and rapacious animals live longer and multiply faster than the sheep. In a word, if our flocks, which are now so prodigiously numerous, were still abandoned, the number and voracity of their enemies would annihilate the species in a very short time.

It is, therefore, probable, that, without the assistance of man, the sheep could never have subsisted, or continued its species in a wild state. The female is absolutely devoid of every art, and of every mean of defence. The arms of the ram are feeble and awkward. His courage is only a kind of petulance, which is useless to himself, incommodious to his neighbours, and is totally destroyed by castration. The wedder is still more timid than the sheep. It is fear alone that makes sheep so frequently assemble in troops: Upon the smallest unusual noise, they run close together; and these alarms are always accompanied with the greatest stupidity*. They know

* Though the talents of the sheep are not so brilliant as those of some other quadrupeds; yet he appears not to be that stupid, defenceless, timid creature painted in the text. All tame animals lose a portion of that sagacity, dexterity, and

know not how to fly from danger, and seem not even to be conscious of the hazard and inconve-

nience and courage, which they are obliged to employ against their enemies in a wild state; because they have been long accustomed to rely upon the protection of man. Sheep, when enslaved by men, tremble at the voice of the shepherd or his dog. But, on those extensive mountains, where they are allowed to range almost without control, and where they seldom depend on the aid of the shepherd, they assume a very different mode of behaviour. In this situation, a ram, or a wedder, boldly attacks a single dog, and often comes off victorious. But, when the danger is of a more alarming nature, like man, they trust not to the prowess of individuals, but have recourse to the collected strength of the whole flock. On such occasions, they draw up into one compact body; they place the young and the females in the centre; and the strongest males take the foremost ranks, keeping close by each others sides. Thus an armed front is presented on all quarters, and cannot be attacked without the greatest hazard of destruction. In this manner they wait, with firmness and intrepidity, the approach of the enemy. Nor does their courage fail them in the moment of attack: For, if the aggressor advances within a few yards of the line, the rams dart upon him with such impetuosity, as lays him dead at their feet, unless he saves himself by flight. Against the attacks of single dogs, or foxes, they are, when in this situation, perfectly secure. Besides, a ram, regardless of danger, often engages a bull, and never fails to conquer him; for the bull, by lowering his head, without being sensible of his defenceless condition, receives between his horns the stroke of the ram, which usually brings him to the ground.

In the selection of food, few animals discover greater sagacity than the sheep; nor does any domestic animal show more dexterity and cunning in its attempts to elude the vigilance of the shepherd, and to steal such delicacies as are agreeable to its palate. The boldness of the female, when not in a state of absolute slavery, in protecting her young from injury, is likewise extremely remarkable. When perfectly tamed, and rendered domestic, the sportive gambols, and troublesome tricks of this animal, are too well known to require any description,

silence of their situation. Wherever they are, there they remain obstinately fixed; and neither rain nor snow can make them quit their station. To force them to move, or to change their route, they must be provided with a chief, who is learned to begin the march: The motions of this chief are followed, step by step, by the rest of the flock. But the chief himself would also continue immoveable, if he were not pushed off by the shepherd, or by his dog, an animal which perpetually watches over their safety, which defends, directs, separates, assembles, and, in a word, communicates to them every movement necessary to their preservation.

OF all quadrupeds, therefore, sheep are the most stupid, and derive the smallest resources from instinct. The goat, who so greatly resembles the sheep in other respects, is endowed with much more sagacity. He knows how to conduct himself on every emergency: He avoids danger with dexterity, and is easily reconciled to new objects. But the sheep knows neither how to fly nor to attack: However imminent her danger, she comes not to man for assistance so willingly as the goat; and, to complete the picture of timidity and want of sentiment, she allows her lamb to be carried off, without attempting to defend it, or showing any marks of resentment. Her grief is not even expressed by any cry different from that of ordinary bleating*.

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But

* This is another heavy charge against the character of the

But this animal, so contemptible in itself, and so devoid of every mental quality, is, of all others, the most extensively useful to man. From the sheep we are at once supplied both with food and cloathing, without mentioning the particular advantages derived from the milk, the fat, the skin, the bowels, the bones, and the dung. To this animal, Nature seems to have given nothing that redounds not to the immediate advantage and conveniency of man.

Love, which, in animals, is the most active and most general sensation, seems to be the only one that communicates vivacity to the ram. When under the influence of this passion, he becomes petulant, fights, and sometimes even attacks the shepherd. But the ewe, though in season,

sheep. But every person who has attended to those animals, at least in this country, must know that the accusation is not altogether just. Individuals, in a state of subjection, seem to have no idea of resisting the attacks of an enemy. But they soon learn that their protection lies in the shepherd or his dog; for, when it becomes necessary, in Britain, to watch the folds, in order to prevent assaults from foxes or dogs, upon the first alarm, the whole flock run with violence to the place where the watchmen are stationed; so that, when they chance to sleep, they are often hurt by the sheep trampling upon them. On other occasions, they never choose to make a very close approach either to men or dogs; but the sense of immediate danger make them forget their usual timidity, and their sagacity teaches them where their safety lies. When the female is robbed of her lamb, she bleats in a manner that strongly marks the anguish she feels. In the eagerness of her search, her eye-balls seem to start from their sockets; and her irregular and distracted motions, joined to the violence and constancy of her bleatings, are evident indications of the most pungent grief.

season, discovers not the smallest emotion: Her instinct extends no farther than not to refuse the approaches of the male, to choose her food, and to distinguish her own offspring from those of the rest of the flock. The perfection, or certainty of instinct, always augments in proportion to the mechanism, or innateness of the cause by which it is produced *. A young lamb, in the midst of the most numerous flocks, searches for, and discovers its mother, without ever once committing a mistake. It has been alledged, that sheep are susceptible of the pleasures of music; that they feed with more appetite, have better health, and fatten sooner, by the sound of the pipe. But the remark is more probable, that music serves only to amuse the shepherd, and that the origin of the art was derived from this solitary and inactive kind of life.

These animals, so simple and dull in their intellect, are likewise very feeble in their constitution. They cannot continue long in motion: Travelling weakens and extenuates them. When they run, they pant, and soon lose their breath.

The

* Here, and in many other places, the principles of materialism make the Count de Buffon express his sentiments obscurely. It would have been more intelligible, and more consonant to truth, if he had said, ' That the instincts of any particular animal are always stronger, in proportion to the smallness of their number.' The sheep has few instincts; and, therefore, as there is less danger of being distracted by a variety of motives to action, the animal is led with greater certainty to the purposes intended by Nature.

The ardour of the sun is equally incommodious to them, as moisture, frost, and snow. They are subject to many diseases, most of which are contagious. A redundancy of fat often kills them, and always renders the ewes barren: They bring forth with difficulty, frequently miscarry, and require more care than any other domestic animal*.

When the ewe is about to bring forth, she should be separated from the rest of the flock, and watched, in order to be ready to assist her in delivery. The lamb frequently presents cross-ways, or by the feet. In such cases, if not assisted, the mother's life is in great danger. When she is delivered, the lamb should be raised on its feet, and the milk should be drawn from the paps of the mother. As this first milk is bad†, and would be hurtful to the lamb, it should not be

* This is unquestionably another exaggeration. The sheep, when nearly in a wild state, is a robust, active animal, and capable of enduring much fatigue without injury. But, when immersed in luxury, and pampered in rich pastures, like creatures of a higher nature, the sheep becomes overloaded with fat, and contracts diseases which are not natural to him; Besides, no tamed animal requires or receives less assistance in bringing forth its young.

† It is difficult to conceive that Nature should prepare a fluid for the nourishment of young animals, which, instead of being salutary, would, in the most critical period of their existence, be noxious to them. Such opinions require the support of facts; for, in this country, no lambs thrive so well as those which are left entirely to the care of the dam. In cases of preternatural labour, or when the mother is much debilitated, assistance is unquestionably necessary; but cases of this kind are not common.

be permitted to suck till a fresh stock has accumulated. The lamb is kept warm, and shut up for three or four days with the mother, that it may learn to know her. To recover the strength of the ewe, she should be fed, for some time, with good hay, grinded barley, or bran mixed with a little salt. Her water should be lukewarm, and whitened with the flour of wheat, beans, or millet. At the end of four or five days, she may be allowed to return by degrees to her ordinary mode of living, and to pasture among her neighbours*; but, to prevent the milk from being chaffed, she should not be conducted to any great distance. Some time after, when the lamb has acquired strength, and begins to frisk about, it may be allowed to follow its mother to the fields.

All the lambs which have the appearance of feebleness are generally sent to the butcher; and those only are kept which are most vigorous, largest, and best covered with wool. Lambs of the first litter are never so good as those of succeeding litters. When we want to rear lambs which are brought forth in the months of October, November, December, January, or February, they are kept in the stable, and only allowed to go out to suck every morning and evening,

* In those parts of Britain where the best sheep are bred, they are never housed, nor, during the lambing season, have any thing administered to them but their ordinary pasture. When in health, sheep have no occasion for water. In our northern climates, it is even injurious to them.

evening, till the beginning of April. Some time before this last period, they are fed with a little grass every day, to accustom them to their new species of nourishment. They may be weaned when a month old; but it is better to suckle them six weeks or two months. White lambs are always preferred to those which are black or spotted; because white wool gives a higher price than that of any other colour.

In the temperate weather of spring or autumn, the lambs may be castrated at the age of five or six months, or even a little later*. There are two methods of performing this operation. The testicles are either removed by incision, or the vessels which terminate in them are destroyed by a strait ligature. Castration renders lambs sick and melancholy. To prevent the disgust which succeeds, they should have bran mixed with salt for two or three days.

At the age of twelve months, rams, ewes, and wedders, lose the two fore-teeth of the under jaw: Six months after, the two neighbouring teeth likewise fall out; and, at three years of age,

* The sooner lambs are castrated, the operation is attended with the less danger. But there is always a necessity for delaying it till the testicles fall down into the scrotum, which sometimes happens not till they are several weeks, or even some months old. There are examples where only one of the testicles descends. In cases of this kind, though the testicle that has come down be cut off, and the animal cannot be distinguished from a wedder; yet he still retains the power of procreating. In Scotland, sheep of this kind are called *wrigglings*.

age, they are all replaced, and are then equal and pretty white. But, in proportion as the animal increases in years, the teeth begin to lose their enamel, and become blunt, unequal, and black. The age of the ram may be known by his horns, which appear the first year, and often at birth, and have a fresh ring added to them every year that he lives. Ewes seldom have any horns; but, in place of them, they have two bony protuberances. Some ewes, however, have two, and even four horns. These ewes are every way similar to the common kind; and their horns are from five to six inches long, and less twisted than those of the ram. When ewes have four horns, the two anterior ones are shorter than the other two. The ram is capable of generating in 18 months, and the ewe can produce when a year old. But it is better to prevent all communication between them till the ewe be two years of age, and the ram three. The young produced at more early periods, and even the first productions of these animals, are always feeble and ill-conditioned. One ram is more than sufficient to serve 25 or 30 ewes*. The ram should always be selected from the strongest and most handsome of his species. They should be garnished with horns; for hornless rams, of which there are some in our climates, are less vigorous

* A ram has been often known to beget one hundred lambs in a single season:

vigorous and less proper for propagating. A good and beautiful ram should have a strong thick head, a wide front, large black eyes, a flat nose, big ears, a thick neck, a long high body, a large crupper and reins, massy testicles, and a long tail. The best rams for breeding are those which are of a white colour, well covered with wool upon the belly, the tail, the head, the ears, and as far as the eyes. Ewes, whose wool is most abundant, most bushy, largest, most silky, and whitest, are always to be preferred, especially if, at the same time, they are large, have thick necks, and walk nimbly. It has also been remarked, that those which are rather meagre than fat, are the best breeders.

The season of ewes is from the beginning of November to the end of April. However, when nourished with stimulating food, as bread made of hemp-seed, and salted water, they conceive at any time †. Ewes are allowed to be covered three

* There are many breeds of sheep in which both males and females want horns; yet they are as vigorous as any of the species. The largest and finest sheep in England have no horns. In some counties, the inhabitants are perfectly unacquainted with horned sheep. In other places; a sheep without horns is as great a rarity as one with four or six horns.

† In this climate, ewes fed in good pastures admit the ram in July or August; but September and October are the months when the greatest part of our ewes, if left to nature, take the ram. Neither is it customary, at this season, to give them dry food; nor would such a practice be possible in large flocks. When the object is to force nature prematurely, some stimula-
ting

three or four times ; after which they are separated from the rams, who prefer the aged ewes, and despise those that are younger. During the rutting season, ewes should not be exposed to rainy or stormy weather ; for moisture prevents conception, and a clap of thunder often produces an abortion. A day or two after copulating, they are allowed to return to their ordinary mode of living ; for, if the use of salted water, hemp-feed-bread, and other stimulating food, were continued, they would infallibly miscarry. They carry five months, and bring forth in the beginning of the sixth. They generally produce one lamb, but sometimes two. In warm climates, they can produce twice a year ; but, in France, and in colder climates, only once. To have lambs in the month of January, the ram is admitted to the ewes towards the end of July, or beginning of August. Those which are covered in September, October, and November, produce in February, March, and April. We may also have plenty of lambs in May, June, July, August, and September ; and they only become rare in October, November, and December. The ewes give milk abundantly for seven or eight months. This milk affords pretty good nou-

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ting food may, perhaps, have the desired effect. It is more common, however, to retard the season of general copulation, by separating the rams from the ewes, than to forward it. The rule is, to admit the ram at such a time as will bring the ewes to lamb when there will be plenty of food for them ; for, if they bring forth before the grass is good, the lambs become poor and feeble.

ishment to children and country-people *. It makes very good cheese, especially when mixed with cow-milk. The time of milking ewes is immediately before they go out to the field, or soon after their return. In summer, they may be twice milked every day, and once in winter.

Ewes, when with young, grow fat ; because they then eat more than at any other period. As they frequently hurt themselves, and miscarry, they sometimes become barren, and some of them produce monsters. However, when properly managed, they bring forth during life, *i. e.* for ten or twelve years ; but they are generally old and useless at the age of seven or eight years. The ram, who lives twelve or fourteen years, becomes unfit for propagating when eight years old. He should then be castrated, and fattened along with the old ewes. The flesh of the ram, even after being castrated and fattened, has always a disagreeable taste : That of the ewe is flabby and insipid. But the flesh of the wedder furnishes the most succulent and best of all our common dishes.

When men want to form a flock with a view to profit, they purchase ewes and wedders at the age of eighteen months, or two years, and a hundred of these might be managed by a single shepherd †. If vigilant, and aided by a good dog,

* The milk of ewes, in its natural state, is nauseous, and seldom used by man in this country. We usually convert it into cheese.

† In an open country, and extensive pasture, a good shepherd, assisted by his dog, will manage, with ease, ten times the number mentioned in the text.

dog, he will lose very few of them. When conducting them to the fields, he ought to go before, accustom them to the sound of his voice, and to following him without stopping, or going aside among the corn, or the vines, where they commit great devastation. The sea-coasts, or plains on the tops of hills, afford them the best pasture. But low, moist, and marshy grounds, should always be avoided. During winter, they are fed, in the stable, with bran, turnip, hay, straw, lucerne, saintfoine, ash and elm leaves, &c. When the weather is not very bad, they should be allowed, chiefly for the sake of exercise, to go out every day. In this cold season, they are not led to the fields before ten in the morning, where they remain for four or five hours: After which they are made to drink, and are conducted back about three o'clock afternoon. In spring and autumn, on the contrary, they are led out as soon as the sun has dissipated the moisture, or hoar-frost, and are not brought back till sun-set. In these two seasons, it is sufficient to make them drink once a-day, and immediately before they return to the stable, where they must always have forage, but in smaller quantity than during winter. It is only in summer that they ought to feed entirely in the fields, where they are conducted twice a-day, and also made to drink twice. They are brought out at day-break, allowed to feed four or five hours, and, after drinking, are led back to the fold, or some
other

other shady place. About three or four o'clock afternoon, when the excessive heat begins to diminish, they are again pastured till night comes on. Were it not for the ravages of the wolf, they ought to remain in the field during the whole night, as is practised in Britain, which would make them both more vigorous and more healthful. As the rays of the sun, when very warm, are apt to affect these animals with a vertigo, they should always be pastured with their heads turned from the sun, so that the body may form a kind of shade to defend the head. Lastly, to preserve their wool, they should not be allowed to feed among thorns, briars, thistles, &c.

In dry elevated grounds, where the wild thyme and other odoriferous plants abound, the flesh of the sheep is of a better quality, than when fed in low moist plains. But sandy downs on the sea-coast produce the best mutton, because the herbage is saltish, and nothing improves the relish of mutton so much as pasture of this kind: Besides, it gives an agreeable savour to the milk of the ewe, and increases its quantity. These animals are extremely fond of salt, and, when given in moderate quantities, it is very salutary. In some places, a bag of salt, or a salt-stone, is put into the fold, which the creatures lick alternately.

Every year, those which begin to grow old, should be separated from the flock, for the purpose of fattening, because then a different management

nagement is necessary. If, in summer, they should be conducted to the field before sun-rising, that they may feed upon grass moistened with dew. Nothing contributes more to fatten wedders than water taken in great quantities; and nothing retards their fattening more than the heat of the sun. For this reason, they should be put into the fold or shade at eight or nine o'clock in the morning, before the heat becomes too violent; and they ought to have a little salt, in order to excite their appetite for water. They should be led out a second time, about four o'clock afternoon, to fresh and moist pastures. By this treatment, they acquire, in two or three months, all the appearances of being fleshy and fat. But this fat, which originates from the great quantities of water drunk by the animal, is only a kind of pursty swelling, and would soon occasion the rot, if not prevented by killing them immediately after they acquire this fallacious appearance. Even their flesh, instead of being firm and juicy, is frequently very loose and insipid. To produce good mutton, beside the treatment above recommended, the animals should have better nourishment than grass. In winter, and indeed in all seasons, they may be fattened by keeping them in stables, and feeding them with the flour of barley, oats, wheat, beans, &c. mixed with salt, to increase their appetite for drink. But, whatever mode be followed, it should be executed as quickly as possible; for they

they cannot be fattened a second time *, most of them dying by diseases of the liver.

Worms are frequently found in the livers of animals: A description of those of the wedder and ox may be seen in the *Journal des Savans* †, and in the *German Ephemerides* ‡. It was formerly imagined, that these worms were peculiar to ruminating animals: But M. Daubenton discovered the same species in the liver of the ass; and it is probable they exist in several other quadrupeds. Butterflies, it has likewise been said, are sometimes found in the liver of the wedder. M. Rouillé communicated to me a letter from M. Gachet de Beaufort, physician at Montiers, of which the following is an extract: ‘ It is an old remark, that our Alpine widders, ‘ which are the best in Europe, sometimes suddenly lose their flesh; that their eyes turn white ‘ and gummy; that their blood grows serous, ‘ having hardly any red globules; that their ‘ tongues are parched; and that their noses are ‘ stuffed with a yellow purulent mucus: Though ‘ the creatures continue to eat plentifully, these ‘ symptoms are accompanied with extreme debility, and at last terminate in death. From repeated dissections, it has been discovered, that ‘ the animals had always butterflies in their livers. These butterflies were white, and furnished with wings; and their heads were near-

ly

* This is not true; for sheep, like other animals, may occasionally lose and regain the fat they had formerly acquired.

† Année 1668.

‡ Tom. 5. Années 1675, and 1676.

ly oval, hairy, and about the size of those of the silk-worm fly. Above seventy, which I squeezed out of the two lobes, convinced me of the truth of this fact. The convex part of the liver was also in a mangled condition. The butterflies are found in the veins only, and never in the arteries. Small butterflies, and likewise small worms, have been discovered in the cystic duct. The vena portarum and capsula Glissonii were so soft, as to yield to the slightest touch. The lungs, and other viscera, were found, &c. If Dr Gachet de Beaufort had been more particular in his description of these butterflies, he might, perhaps, have removed the suspicion, that the animals he saw were only the common worms found in the liver of the sheep, which are very flat, broad, and of a figure so singular, as to appear, at first sight, to be rather leaves than worms.

The wool of the sheep is shorn every year. In warm countries, where no danger arises from making the animal quite bare, they do not shear the wool, but tear it off; and this operation is performed twice a-year. But in France, and in colder climates, the fleece is shorn only once a-year, and a part of it is allowed to remain, in order to protect the animal from the inclemency of the weather*. The operation is performed in

* The fleece of the sheep, like the fur of most other quadrupeds, loosens from the skin in the beginning of summer, and, if permitted, would fall, of its own accord, from the animal's body.

in the month of May, after washing the sheep, to render the wool as clean as possible. The month of April is too cold; and, if delayed till June or July, the wool does not grow sufficiently long to protect the animal from the cold of winter. The wool of the wedder is generally better, and in greater quantity, than that of the ewe or ram. The wool upon the neck and about the top of the back, is of a better quality than that upon the thighs, the tail, the belly, &c. and that taken from dead or diseased animals, is the worst. White wool is preferred to gray, and brown,

To prevent the waste which would ensue, the farmer sheers his sheep before the fleeces become altogether loose. If the operation be longer delayed, the fleece breaks and falls off in detached pieces. Thus the proper season for sheering sheep is determined by Nature. When the young fleece begins to grow, it pushes the old one before it, which becomes loose at the root, and the sheep, after the operation, remains covered with close short wool. When sheep are shorn before the young fleece has begun to grow, they are left too bare, and are in danger of catching cold. Besides, that part of the old fleece which is left on the animal, is entirely lost. If, on the other hand, the operation be delayed till the young fleece has grown so long as to mix with the old one, a part of the former will be cut off, which, by being too short, is not only perfectly useless, in manufactures, but injures the long wool among which it is blended. For these reasons, a skillful farmer sheers not all his sheep indiscriminately at the same time, but occasionally as the fleeces become ripe.

It was formerly the practice, instead of sheering, to pluck the wool from the sheep. But, though it might be done at different times, as parts of the fleece loosened, without giving the animal any pain; yet the practice is slovenly, incompatible with the management of large flocks, and often attended with a considerable loss of wool.

brown; or black, because it is capable of being dyed any colour; and smooth sleek wool is better than that which is curled. It is even alleged, that widders, whose wool is curled, are not so good as the others.

Land may be much improved by folding sheep: For this purpose a piece of ground is inclosed, and the flock shut up in it every night during the summer-season. The dung, urine, and heat of the animals soon meliorate exhausted, cold, or barren grounds. A hundred sheep, in one summer, will fertilize eight acres of land for six years.

It has been remarked by the antients, that all ruminating animals have suet: But this remark, strictly speaking, holds only with regard to the sheep and goat: The suet of the widder is more copious, whiter, drier, firmer, and better than that of any other animal. Fat or grease is very different from suet, the former being always soft, while the latter hardens in cooling. The greatest quantity of suet is found about the kidneys; and the left kidney furnishes more than the right. There are also considerable quantities in the epiploon or web, and about the intestines; but it is not near so firm or good as that of the kidneys, the tail, and other parts of the body. Widders have no other grease but suet; and this matter is so prevalent in their bodies, that their whole flesh is covered with it. Even the blood contains a considerable quantity

of suet; and the semen is so charged with it, as to give that liquor a different appearance from that of other animals. The semen of men, of the dog, horse, ass, and probably of every animal which affords not suet, dissolves with cold; or, when exposed to the air, becomes more and more fluid from the moment it escapes from the body. But the semen of the ram, and perhaps of every animal that has suet, hardens and loses its fluidity with its heat. I remarked this difference when examining these liquors with the microscope: That of the ram fixes a few seconds after coming from the body; and, in order to discover the living organic particles, of which it contains prodigious numbers, its fluidity must be preserved by the application of heat.

In the sheep, the taste of the flesh, the fineness of the wool, the quantity of suet, and even the size of the body, vary greatly in different countries. In France, the province of Berri abounds most in sheep. Those about Beauvais, and in some other parts of Normandy, are fatter and more charged with suet. They are very good in Burgundy; but the best are fed upon the sandy downs of our maritime provinces. The Italian, Spanish, and even the English wools, are finer than the French wool. In Poitou, Provence, the environs of Bayonne, and several other parts of France, there is a race of sheep which have the appearance of being foreign. They are larger, stronger, and better

Plate XIV.



RAM

A Bell, sculpt.

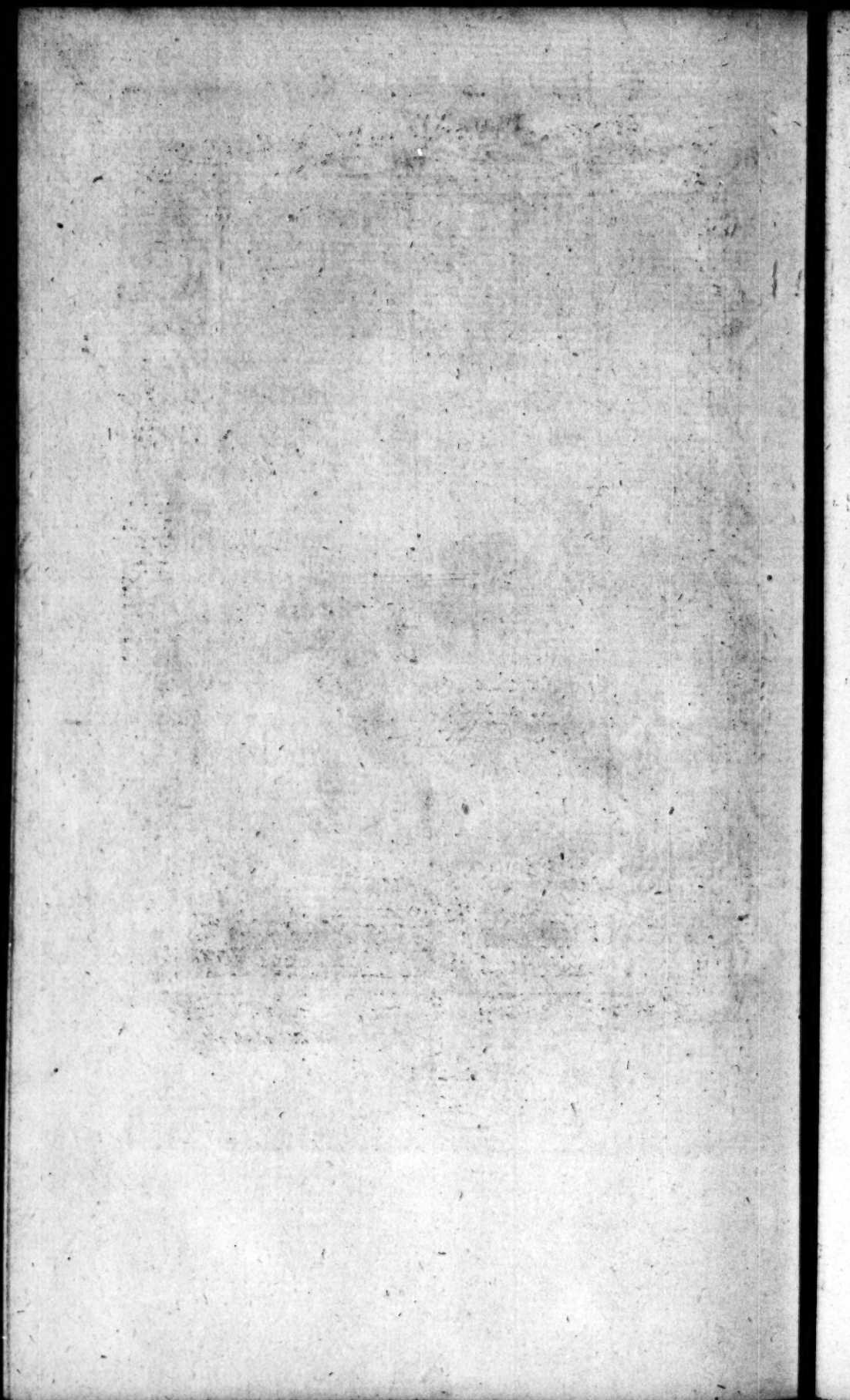
PLATE XIV

Plate XV.



EWE

A Bell Sculp.



better covered with wool than the common kind. They are likewise more prolific, producing frequently two lambs at a time. The rams of this race engender with the common ewes, and produce an intermediate kind. In Italy and in Spain, there are a great variety of races; but they ought all to be regarded as of the same species with our common sheep, which, though so numerous and diversified, extend not beyond Europe. Those animals with a long broad tail, so common in Asia and Africa, and which are called Barbary sheep by travellers, appear to be a species different from the ordinary kind, as well as from the Pacos and Lama of America.

As white wool is most valued, black or spotted lambs are generally slaughtered. In some places, however, almost all the sheep are black; and black lambs are often produced by the mixture of white rams with white ewes. In France, there are only white, brown, black, and spotted sheep: But in Spain, there is a reddish kind; and, in Scotland, there are some of a yellowish colour. But all these varieties of colour are more accidental than those produced by different races, which, however, proceed from the influence of climate, and the difference of nourishment.

SUPPLEMENT.

S U P P L E M E N T.

I here give figures of a ram and ewe, of which drawings were sent me by the late Mr Colinson, fellow of the Royal Society of London, under the names of the *Walachian ram, and ewe*. As this learned naturalist died soon afterwards, I could not discover whether these sheep, whose horns are extremely different from those of the ordinary kind, be common in Walachia, or whether they are only an accidental variety.

In the northern parts of Europe, as Denmark and Norway, the sheep are not good; but, to improve the breed, rams are occasionally imported from England. In the islands adjacent to Norway, the sheep remain in the fields during the whole year; and they become larger and produce finer wool than those which are under the care and direction of men. It is alledged, that those sheep, which enjoy perfect liberty, always sleep, during the night, on that side of the island from whence the wind is to blow next day. This natural indication of the weather is carefully attended to by the mariners*.

The rams, ewes, and wedders of Iceland, differ chiefly from ours, by having larger and thicker horns. Some of them have three, four, and even

* Pontopiddan's Nat. Hist. of Norway.

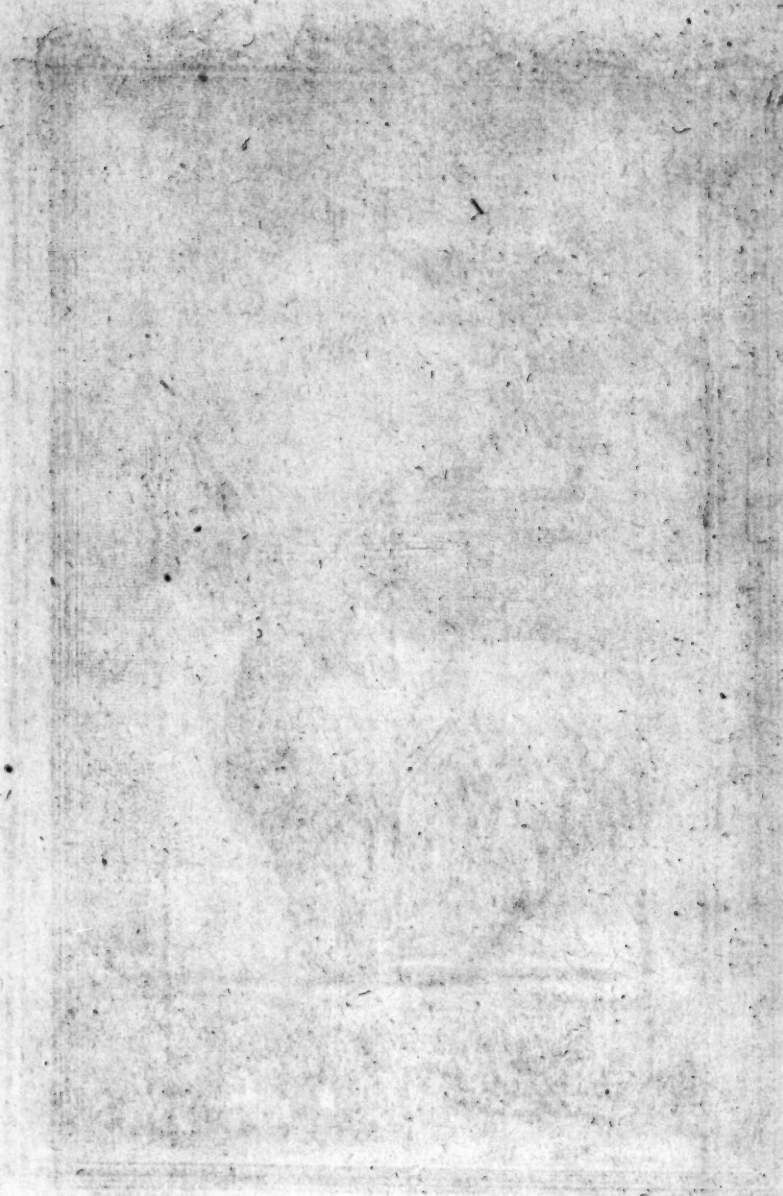
2^d Plate XV.



Alfred Soutter

WALLACHIAN RAM

1711

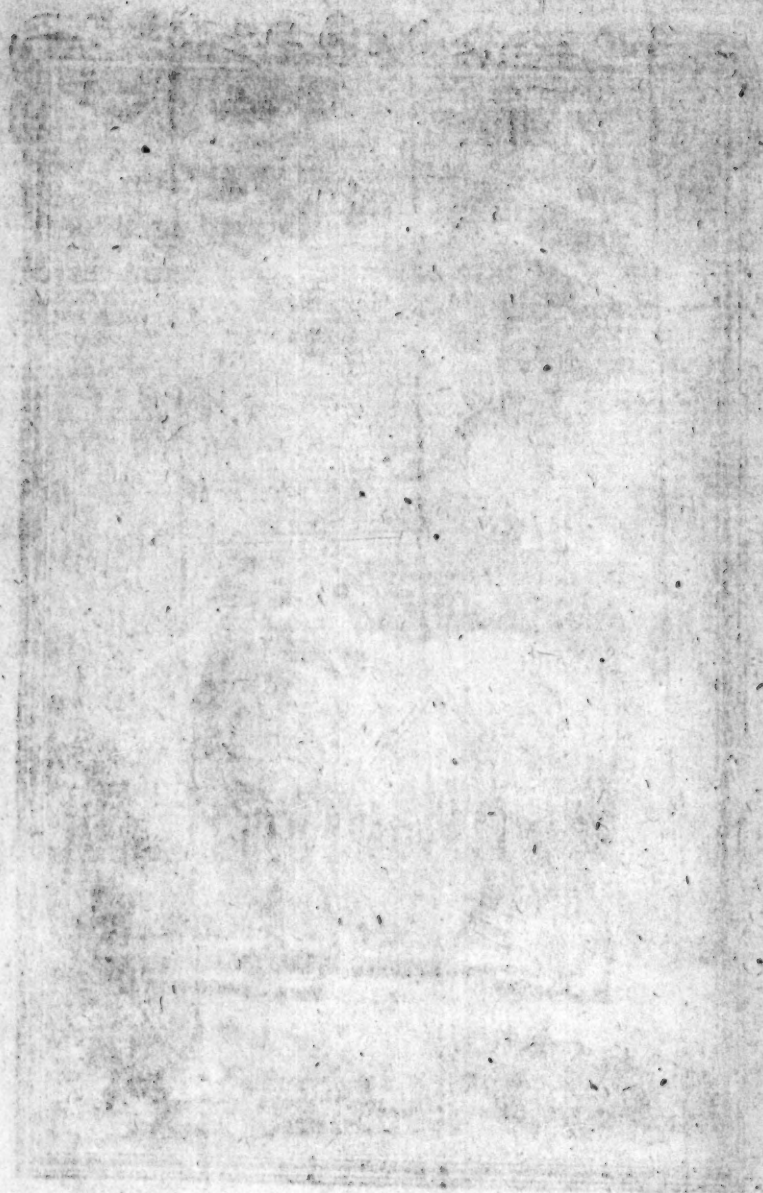


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3^d Plate XV.



WALLACHIAN EWE



even five horns. But this peculiarity of having more horns than two, must not be considered as common to the whole race of Iceland sheep; for, in a flock of four or five hundred, hardly three or four wedders can be found with four or five horns, and these are sent to Copenhagen as rarities. As a farther proof of their being scarce, they give a higher price in Iceland than the common kind.

Hist. gen. des voyages, tom. 18. p. 19.

even five horns. But this peculiarity of having
 more horns than two, will not be considered as
 common to the whole race of feeding sheep; for,
 in a flock of four or five hundred, hardly three
 or four wethers can be found with four or five

THOUGH the species of animals are separated from each other by an interval, which Nature cannot overleap; yet some species approach so near to others, and their mutual relations are so numerous, that space is only left for a bare line of distinction. When we compare these neighbouring species, and consider them in relation to ourselves, some appear to hold the first rank for utility, and others seem to be only auxiliary species, which might, in many respects, supply the place of the first. Thus the ass might nearly supply the place of the horse, and the goat that of the sheep. The goat, like the sheep, affords both milk and suet in considerable quantities. His hair, though coarser than wool, is capable of being made into very good cloth; his skin is more valuable than that of the sheep; and the flesh of the kid makes a near approach to

* The horns of the goat bend backward, and are almost close at their base. There are eight cutting teeth in the lower jaw, and none in the upper. The hoofs are cloven; and the male is generally furnished with a beard.

Capra, Gefner. quad. 266. Raii syn. quad. 77. Aldr. bif. fulc. 635.

Capra hircus, cornibus carinatis arcuatis, gula barbata. *Lynn. sist* 94. *Faun. Succ.* 44.

Siegen bock, siege, Klein. quad. 15.

Le Bout, La Chevre, Brisson. quad. 38. Goat Brit. Zool. I.

to that of the lamb, &c. These auxiliary species are more rustic and robust than the principals: The ass and the goat require not near so much attention as the horse and the sheep. They every where find the means of subsistence, eating almost indiscriminately the grossest as well as the most delicate plants. They are less affected by the influence of climate, and can better dispense with the aid of man. The less they depend on us, the more they seem to belong to Nature; and, instead of regarding these sabaturn species as degenerated productions of the principal species, instead of considering the ass as a degenerated horse, it would be more consonant to reason, to say, that the horse is an improved ass; that the sheep is a more delicate kind of goat, which we have trained, raised to greater perfection, and propagated for our own use; and, in general, that the most perfect species, especially among domestic animals, derive their origin from those wild and less perfect kinds which make the nearest approach to the former. The powers of Nature, when united to those of man, are greatly augmented.

Independent of reasonings of this kind, the goat is a distinct species, and perhaps still farther removed from the sheep than the ass from the horse. The buck as willingly copulates with the ewe, as the jack-ass with the mare; and the ram embraces the she-goat in the same manner as the horse intermixes with the she-ass. But, though

though these commixtures be frequent, and sometimes prolific, no intermediate species has been formed between the goat and sheep. The two species are distinct, and still remain at the same distance from each other. No change has been effected by these mixtures; they have given rise to no new or middle race of animals. They have only produced individual differences, which have no influence on the unity of each primitive species, but, on the contrary, confirm the reality of their characteristic and essential distinctions.

In many cases, however, we cannot distinguish these characteristic differences with sufficient certainty: In others, we are obliged to suspend our judgment; and, in the greatest number, we have not a single ray of light to direct us: For, independent of the uncertainty arising from the contradictory testimonies with regard to historical facts; independent of the doubts resulting from the inaccuracy of those who have endeavoured to study Nature, the greatest obstacle to the advancement of knowledge proceeds from our ignorance of many effects which time alone has not been able to exhibit, and which will not be discovered even by posterity, without numberless experiments, and the most accurate investigation. In the mean time, we wander in darkness, perplexed between probabilities and prejudices, ignorant even of possibilities, and every moment confounding the opinions of men with the operations of Nature. Examples are innumerable:

merable: But, without leaving our subject, we know that the he-goat and ewe, and the ram and she-goat, procreate together: We have still to learn, however, whether the mules produced by these commixtures be barren or fruitful. Because mules produced by the mixture of the horse with the she-ass, or the jack-ass with the mare, are sterile, we conclude that mules of every kind must likewise be deprived of the power of transmission. But this opinion may be false. The antients assert positively, that the mule produces at the age of seven years; and that it likewise produces with the mare *. They tell us, that the she-mule is capable of conception; but that she is unable to bring her fruit to perfection †. The truth of these facts, which obscure the real distinctions of animals, as well as the theory of generation, should be either confirmed or destroyed. Besides, though we had a distinct knowledge of all the species of animals around us, we are still ignorant of what might be produced by intermixture with each other, or with foreign animals. We have no proper information concerning the jumar, an animal said to be produced by the cow and jack-ass, or by the mare and bull. We know not whether the zebra can produce with the horse or ass, or the

VOL. III. Q q q broad-

* *Mulus septennis implere potest, et jam cum equa conjunctus hinnum procreavit.* *Arist. hist. animal. lib. 6. cap. 24.*

† *Itaque concipere aliquando mula potest, quod jam factum est; sed enutrire atque in finem perducere non potest. Mas generare interdum potest.* *Id. lib. 2. cap. 6.*

broad-tailed Barbary ram with the common ewe; whether the chamois goat be only the common goat in a wild state, and whether an intermediate race might not be formed by their mixture; whether the monkeys really differ in species, or whether they form but one species, diversified, like that of the dog, by a great number of different races; whether the dog can produce with the fox and the wolf, the stag with the ewe, &c. Our ignorance of all these facts is almost invincible; for the experiments necessary to ascertain them would require more time, attention, and expence, than the life or fortune of most men can permit. I employed several years in making trials of this kind, of which an account shall be given when I treat of mules. But, in the mean time, I acknowledge, that they afforded me very little information, and that most of my experiments were abortive.

Upon the determination of these and similar facts, however, our knowledge of the distinction of species, and of the genuine history of animals, as well as the manner of treating them, chiefly depends. But, since we are deprived of this necessary knowledge; since it is impossible, for want of facts, to establish analogies, or to lay a proper foundation for reasoning, there is no other method left us, than to proceed, step by step, to consider each animal individually, to regard as different species all those which spontaneously procreate together, and to write their history in detached

detached articles ; reserving a power of uniting or separating them, as soon as we shall acquire a more perfect knowledge, either from our own experience, or that of other men.

It is for this reason, that, though there are many animals which resemble the sheep and goat, we here confine ourselves entirely to the domestic kinds. We know not whether the foreign kinds could intermix with the common species, and produce new races. We are, therefore, authorised to consider them as distinct species, till sufficient evidence is procured, that the foreign kinds can procreate with the common, and produce fertile individuals : This is the only character which constitutes the reality of what is called *species* both in the animal and vegetable kingdoms.

The goat is superior to the sheep both in sentiment and dexterity. He approaches man spontaneously, and is easily familiarized. He is sensible of caresses, and capable of a considerable degree of attachment. He is stronger, lighter, more agile, and less timid than the sheep. He is a sprightly, capricious, wandering, lascivious animal. It is with difficulty that he can be confined to a flock. He loves to retire into solitude, to climb steep and rugged places, to stand and even to sleep on the points of rocks, and the edges of the most frightful precipices. The female anxiously searches for the male ; and they unite with ardour. They are robust and easily nourished ;
for

for they eat almost every herb, and are injured by a very inconsiderable number. The bodily temperament of the goat, which, in all animals, has a great influence on the natural dispositions, is not essentially different from that of the sheep. These two animals, whose internal organization is almost entirely similar, are nourished, grow, and multiply in the same manner; and their diseases are the same, excepting a few to which the goat is not subject. The goat fears not, like the sheep, too great a degree of heat. He cheerfully exposes himself to the sun, and sleeps under his most ardent rays, without being affected with a vertigo, or any other inconveniency. He is not afraid of rain or storms; but he appears to feel the effects of severe cold. The external actions and movements of animals, which, as formerly remarked, depend more upon the strength and variety of their sensations, than the structure of their bodies, are, for this reason, more vivacious, and less limited in the goat than in the sheep. The inconstancy of the goat's disposition is marked by the irregularity of his actions. He walks, stops short, runs, leaps, approaches, retires, shows, and conceals himself, or flies off, as if he were actuated by mere caprice, and without any other cause than what arises from an excentric vivacity of temper. The suppleness of his organs, and the strength and nervousness of his frame, are hardly sufficient to support

support the petulance and rapidity of his harsh movements.

That these animals are naturally friends to man, and that, even in uninhabited countries, they betray no savage dispositions, is apparent from the following fact. In the year 1698, an English vessel having put into the island of Bonavista, two Negroes came aboard, and offered *gratis* to the captain as many goats as he pleased. The captain having expressed his astonishment at this offer, the Negroes replied, that there were only twelve persons on the island; that the goats had multiplied so greatly as to become extremely troublesome; and that, instead of being caught with difficulty, they obstinately followed the men, like other domestic animals.

The male is in a capacity of engendering when he is a year old, and the female when she is seven months. But the fruits of such premature embraces are feeble and imperfect; and, for this reason, they are generally restrained till they arrive at the age of eighteen months or two years. The he-goat is a beautiful, vigorous, and ardent animal. In the course of two or three months, one male is sufficient for more than 150 females. But this ardour, which soon consumes him, lasts only three or four years; and, at the age of five or six, he is old and enervated. Hence, a male for breeding should be large,

large, handsome, and not exceeding two years of age. His neck should be short and fleshy; his head light; his ears pendent; his thighs thick; his limbs firm; his hair black, thick, and soft; and his beard long and bushy. The choice of the female is not of equal importance. It may only be remarked, that those which have large bodies, thick thighs, a light walk, long and capacious udders, and soft bushy hair, ought to be preferred. The females are in season during the months of September, October, and November: But, when allowed to approach the male, they are willing to receive him, and are capable of producing, in all seasons. They, however, hold much surer in autumn; and the months of October and November are preferred; because the young kids are brought forth when the grass is tender. They go with young about five months, and are delivered in the beginning of the sixth. They suckle their young a month or six weeks. Thus, six months and a half should be reckoned between the time when they are covered, and that when the kid begins to feed upon pasture.

When pastured along with sheep, the goats always take the lead of the flock. They love to feed separately upon the tops of hills, and prefer the most elevated and rugged parts of mountains. They find sufficient nourishment in heathy, barren, and uncultivated grounds. They do infinite mischief when permitted to go among

among corn, vines, copses, or young plantations; for they eat with avidity the tender bark and young shoots of trees, which generally proves fatal to their growth. They carefully avoid moist ground, marshy meadows, and rich pastures. They are seldom reared in plain countries, where they never thrive, and where their flesh is always bad. Vast quantities are reared in warm climates; and they are never put into stables. In France, they would perish, if not sheltered during winter. They require no litter in summer; but, in winter, as moisture is very hurtful to them, they should be frequently supplied with fresh litter, and never allowed to lie upon their own dung. They are conducted to the fields very early in the morning, grass covered with dew, which is injurious to sheep, being extremely salutary to goats. As they are untractable and wandering animals, one man, however robust and active, is unable to manage above fifty of them. They are never permitted to go out during snow or hoar-frost; but are fed in the stable with herbage, small branches of trees collected in autumn, cabbages, turnips, and other roots. The more they eat, the quantity of their milk is the greater. To increase the quantity of milk still more, they are made to drink much, by mixing a little nitre or salt with their water. The milk may be drawn from them five days after bringing forth; and they continue to yield considerable quantities of it,

it, every morning and evening, for four or five months. The female produces but one kid, though sometimes two, seldom three, and never more than four. She is fertile from one year or eighteen months, till she be seven years of age. The male may propagate as long, and perhaps longer, if he were properly managed; but he is seldom employed above five years. He is then sent to be fattened among the old and young male goats, which have been castrated, to render their flesh more tender and succulent. These are fattened in the same manner as widders. But, whatever attention is bestowed on them, or however they are fed, their flesh is never so good as mutton, excepting in very warm climates, where mutton is always ill-tasted.

The strong odour of the he-goat proceeds not from his flesh, but from his skin. These animals, which are not permitted to grow old, might perhaps live ten or twelve years. Whenever they cease to multiply, they are killed; and the older they are, their flesh is the worse. Both males and females, with very few exceptions, are furnished with horns. The colour of their hair is exceedingly various. It is said, that those which are white, and have no horns, give most milk; and that the black goats are the strongest. Though the food of those animals costs almost nothing, yet they fail not to bring considerable profit. Their flesh, tallow, hair,
and

and skin are valuable commodities. Their milk is more wholesome and better than that of the sheep: It is used as a medicine, curdles easily, and makes very good cheese. As it contains only few oily particles, the cream should never be separated from it. The females allow themselves to be sucked by infants, to whom their milk affords very good nourishment. Like cows and sheep, they are sucked by the *viper*, and still more by a bird called the *goat-sucker*, which fixes on their paps during the night, and, it is said, makes them lose their milk *.

The goat has no cutting teeth in the upper jaw. Those of the under jaw fall out, and are replaced in the same time, and in the same order, as the teeth of the sheep. The age of the goat is indicated by the teeth and the knobs of the horns. The number of teeth in the she-

R r r

goat

* That the viper sucks cows, sheep, and goats, has all the appearances of a vulgar error; and should not, therefore, have been related so seriously, unless the author could have supported what he advances with the most unquestionable facts. As to the goat-sucker, though it has been blamed for this practice by most naturalists; yet I am convinced, that the accusation has not the smallest foundation in truth. This bird, which feeds upon moths, flies, and other insects, has indeed the power of opening its mouth to an uncommon width. But nothing can be more opposite to the structure of parts necessary for the operation of sucking, than the bill of a bird. The frequent attendance of those birds upon cattle of all kinds has probably given rise to this ridiculous notion. They attend cattle, not to suck them, but to seize the flies and other insects which perpetually assemble about these animals. This reasoning will acquire additional force, when it is considered, that the goat-sucker attends males as constantly as females.

goat is not uniform: They are generally fewer than those of the male, whose hair is also more rude, and his beard and horns longer. These animals, like the ox and sheep, have four stomachs, and chew the cud. Their species is more universally diffused than that of the sheep. Goats, every way similar to our own, are found in many parts of the world. They are only smaller in Guiney and other warm climates, and larger in Muscovy and other northern regions. The goats of Angora, or of Syria, with pendent ears, are of the same species with ours; for they intermix together, and produce even in our climates. The horns of the male are equally long with those of the common kind; but they are directed and contorted in a different manner. They extend horizontally from each side of the head, and form spirals nearly like those of a screw. The horns of the female are short, bend backwards, downwards, and then advance forwards, so as to terminate near the eyes; but their direction and contour are not always uniform. The present description was taken from a male and female in the royal menage. Like most Syrian animals, their hair was very long and bushy, and so fine, that cloths, as beautiful and glossy as silken stuffs, are made of it.

S U P P L E -

Plate XVI



THE GOAT

A. Bell, sculpt.

PLATE XXII



THE GOAT

Plate XVII.



SHE GOAT

J. Ball sculp.

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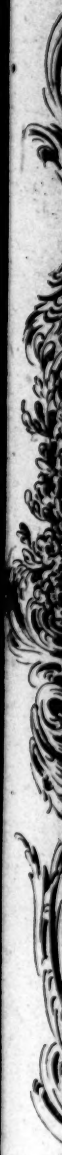
Plate XVIII.



HE GOAT of ANGORA

A. Bell Sculp.

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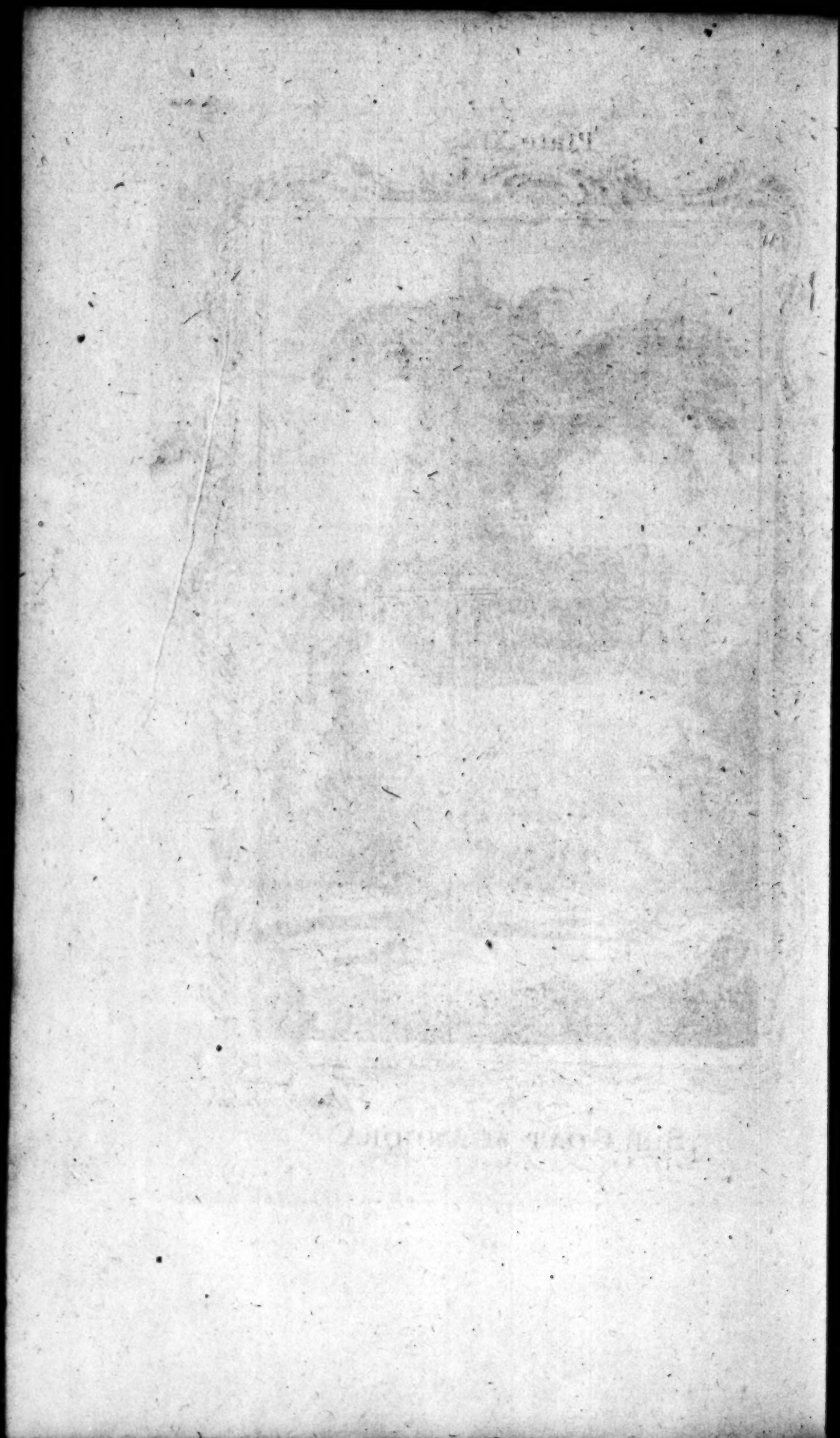
THE UNIVERSITY OF CHICAGO

Plate XIX.



A. Bell sculpt.
SHE GOAT of ANGORA

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SUPPLEMENT.

We are informed by Pontoppidan *, that goats are so numerous in Norway, that, from the port of Bergen alone, 80,000 raw hides are annually exported, without reckoning those which have been dressed. Goats, indeed, seem to be well adapted to the nature of this country: They search for their food upon the tops of the highest and most rugged mountains. The males are very courageous; they fear not the attack of a single wolf, and even assist the dogs in defending the flock.

THE

* Nat. hist. of Norway.

The HOG, the HOG of SIAM, and the WILD BOAR*.

I HAVE joined these three animals, because they form but one species. The one is the wild animal, the other two are the same animal, only in a domestic state. Though they differ in some external marks, and perhaps likewise in some habits; yet, as these differences are not essential, but relative to their condition, as their nature is not altered by their slavery, and, lastly, as they can produce, by intermixture,

* The common hog or sow is cloven hoofed, and has cutting teeth in both jaws, and two large tusks above and below. The body is covered with bristles. In a wild state, it is of a dark brindled colour; beneath the bristles, there is soft, curled, short hair; and the ears are short, and a little rounded. When tame, the ears are long, sharp-pointed, and slouching; and the colour is generally whitish, but sometimes mixed with other colours: *Pennant, Synops. p. 68.*

Gen. charact. Sus, dentes primores superiores iv. inferiores vi. prominentes. Laniarii superiores ii. breviores, inferiores i. exerti. Rostrum truncatum, prominens, mobile. *Spect. charac.* Sus scrofa, dorso antice setoso, cauda pilosa; *Linn. Syst. 102.*

Sus fera, aper, Plin. lib. viii. c. 51. Gefner, quad. 918.

Sus agrestis, five aper, wild boar or swine. Raii Syn. quad. 96.

Wieprz lesny, Dzik, Rzaczynski Polon. 213.

Schwein, Klein. quad. 25.

Sus caudatus, auriculis brevibus, subrotundis, cauda pilosa. *Brisson. quad. 75.*

ture, fertile individuals, the only character which constitutes a distinct and permanent species, they ought not to be treated as separate animals.

These animals are remarkably singular: Their species is solitary and detached. It is approached by no neighbouring species, which, like that of the horse and ass, and of the sheep and goat, may be regarded as principal or as accessory. Neither is it subject to a variety of races, like that of the dog. It participates of several species; but differs essentially from the whole. Let those who wish to limit the immensity of Nature to the contracted views of imperfect systems, attend to this animal, and they will discover, that it eludes all their methodical arrangements. Its extremities, which are *cloven-hoofed*, have no resemblance to those that are *whole-hoofed*. It even resembles not the *cloven-hoofed* animals; because, though it appears to have only two toes, it has actually four concealed within. It has no resemblance to the *digitated* quadrupeds; because it walks only on two toes, and the other two are neither so situated, nor extended so far, as to serve the purposes of walking. It has, therefore, equivocal or ambiguous characters, of which some are apparent and others concealed. Shall we consider this as an error of Nature, and maintain that the two internal toes should not be reckoned? But this error is constant. Besides, in this animal, the other bones of the foot have no resemblance to those of cloven-footed animals;

mals ; and there are other differences still more striking : For the latter have horns and no teeth in the upper jaw ; they have four stomachs, chew the cud, &c. But the hog has no horns, only one stomach, does not ruminate, and has cutting teeth both above and below. It is evident, therefore, that he belongs neither to the genus of whole-hoofed, nor to that of cloven-hoofed. He has as little pretension to be ranked with the digitated quadrupeds ; for he differs from them not only in the extremity of his foot, but still more in his teeth, stomach, intestines, internal parts of generation, &c. All that can be said is, that, in some respects, he forms the link between the whole and cloven-footed animals, and, in others, between the cloven-footed and digitated animals ; for, in the number and arrangement of his teeth, he differs less from the whole-hoofed quadrupeds than from the other kinds. He also resembles them in the prolongation of the jaws, and, like them, he has but one large stomach ; but, by an appendix attached to it, as well as by the position of the intestines, he seems to approach towards the cloven-footed or ruminant animals. He likewise resembles them in the external parts of generation ; and, at the same time, he resembles the digitated quadrupeds in the form of his legs, in the habit of his body, and in the number of his progeny. Aristotle * is

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* Quadrupedum autem, quae sanguine constant, eadem quae animal generant, alia multifida sunt ; quales hominis ma-

the first writer who divided quadrupeds into whole-hoofed, cloven-hoofed, and digitated, and he allows that the hog is an ambiguous genus. But the only reason he assigns is, that, in Illyrica, Poconia, and some other places, there are whole-hoofed hogs. This animal still affords a kind of exception to two general laws of nature, namely, that the larger the animals, they are the less prolific; and that digitated animals are the most prolific. The hog, though of a size far beyond mediocrity, produces more than any other quadruped. By this surprising fecundity, as well as by the structure of the ovaria of the female, it seems to constitute the extremity of the viviparous species, and to approach to those of the oviparous. In fine, the hog seems to be of an equivocal nature, or rather he appears so to those who mistake the hypothetical arrangement of their ideas for the common order of Nature, and who only perceive, in the infinite chain of being, some conspicuous points to which they incline to refer every natural phaenomenon.

To circumscribe the sphere of Nature, is not the proper method of acquiring the knowledge of

nus pedesque habentur. Sunt enim quae multiplici pedum fissura digitentur, ut canis, leo, panthera. Alia bisulca sunt, quae forcipem pro ungula habeant, ut oves, caprae, cervi, equi fluviatiles. Alia infisso sunt pede, ut quae solipedes nominantur, ut equus, mulus. Genus sane suillum ambiguum est; nam et in terra Illyriorum, et in Poconia, et nonnullis aliis locis, sues solipedes gignuntur. *Aristot. de hist. animal. lib.*

of her. We cannot judge of her, by making her act agreeably to our particular and limited views. We can never enter deeply into the designs of the author of Nature, by ascribing to him our own ideas. Instead of limiting the powers of Nature, we ought to enlarge and extend them; we should regard nothing as impossible, but believe that every thing which can have existence, really exists. Ambiguous species, and irregular productions, would not then excite surprise, but appear to be equally necessary as others, in the infinite order of things. They fill the intervals, and constitute the intermediate points of the chain. These beings present to the human intellect, curious examples, where Nature, by appearing to act upon an unusual model, makes a greater display of her powers, and affords us an opportunity of recognising singular characters, which indicate that her designs are more general than our contracted views, and that, if she has made nothing in vain, neither are her operations regulated by the designs which we attribute to her.

Does not this singular conformation of the hog merit a few reflections? He appears not to have been constructed upon any original or perfect model; for he is a composition of different animals. Some of his parts, for example, the toes above described, the bones of which are perfectly formed, are evidently of no use to him. Nature, therefore, in the construction of beings,

is by no means subjected to the influence of external causes. Why should she not sometimes give redundant parts, when she so often denies those which are essential? How many animals are deprived of senses and of members? Why should we imagine, that, in each individual, every part is useful to its neighbour, and necessary to the whole? Is it not enough that they exist together, that they never injure each other, that they can grow and expand without mutual destruction? Every thing which is not so hostile as to destroy, every thing that can subsist in connection with other things, does actually subsist: And, perhaps, in most beings, there are fewer relative, useful, or necessary parts, than those which are indifferent, useless, or redundant. But, as we always wish to make every thing refer to a certain end, when parts have no apparent uses, we either suppose that their uses are concealed from us, or invent relations which have no existence, and tend only to throw an obscure veil over the operations of Nature. It is the intention of true philosophy, to instruct us *how* objects exist, and the manner in which Nature acts: But we pervert this intention, by attempting to investigate *why* objects are produced, and the ends proposed by Nature in producing them.

This general and presumptuous prejudice, which serves only to conceal our ignorance, is both useless, and prevents the discovery of natural truths. Without deviating from our subject,

some examples may be given where those intentions, which we so arrogantly ascribe to Nature, are evidently false and contradictory. The phalanges of the hand or foot are said to be formed for the purposes of producing fingers and toes; yet, in the hog, the phalanges are useless, because they give rise to no toes which benefit the animal; and cloven-hoofed animals have small bones in their feet, which do not even form phalanges. Hence, if Nature intended to produce toes in these animals, it is evident, that, in the hog, she has only half-executed her design, and, in the others, that she has hardly begun it.

The allantois is a membrane accompanying the foetus of the sow, the mare, the cow, and several other animals. As this membrane adheres to the bladder of the foetus, it was said to be destined for the reception of the urine discharged during the time of gestation. At the instant of birth, an inconsiderable quantity of liquor is found in the allantois. In the cow this liquor is perhaps most abundant; and yet the allantois contains only a few pints: The capacity of the membrane is here so great, that no proportion subsists between it and the liquor. This membrane, when filled with air, forms a double bag in the shape of a crescent, about thirteen or fourteen feet long, by nine, ten, eleven, and sometimes twelve broad. Is a vessel, capable of containing several cubic feet, necessary for the reception

reception of three or four pints of fluid? The bladder of the foetus, if not pierced at the bottom, would itself be sufficient to contain this quantity, as it does in man and other animals, in which no allantois has hitherto been discovered. Hence this membrane is not designed for receiving the urine of the foetus, nor for any purpose that we can ascribe to it; for, if it were filled, as, according to our mode of reasoning, it ought sometimes to be filled, it would be as large as the body of the mother. Besides, as it bursts at the moment of birth, and is thrown away along with the other membranes which invest the foetus, it is equally useless then as it was before.

The number of paps, in every species of animals, it has been said, is proportioned to the number of young which the female is capable of producing and suckling. But why should the male, who never produces, have generally the same number of paps? And why should the sow, which often produces eighteen, and even twenty pigs, have only twelve paps, and sometimes fewer? Does not this prove that the operations of Nature are not to be judged of by final causes, or moral fitness, but by examining the manner in which she acts, and by employing, to acquire a knowledge of her, all those physical relations exhibited to us by the immense variety of her productions. I allow, that this method, which is the only path that can conduct us to
real

real knowledge, is incomparably more difficult than the other, and that there are innumerable facts in Nature, to which, like the preceding, it cannot be applied with success. However, instead of searching for the use of this great capacity in the allantois, and finding that it neither serves, nor can serve, any purpose, we ought to inquire into those physical relations which may indicate the origin of its production. By observing, for example, that, in animals whose stomach and intestines are not very large, the allantois is either very small, or does not exist; and that, consequently, the production of this membrane has some connection with the great capacity of the intestines, &c. In the same manner, by considering, that the number of paps is not equal to the number of young, admitting only the most prolific animals to have the greatest number of paps, we may conjecture, that this numerous production depends on the conformation of the internal parts of generation, and that the paps, depending also externally on the same parts, there is, between the number or arrangement of these parts, and that of the paps, a physical relation which ought to be investigated.

But I only point out the true path, this not being a proper place for prosecuting such nice discussions. However, I must remark, that numerous productions depend more upon the structure of the internal parts of generation than any other cause: They depend not upon the quantity

tity of seminal fluid, otherwise the horse, the stag, the ram, and the goat, would be more prolific than the dog, the cat, and other animals which secrete less semen in proportion to their size. But the prolific powers of the latter far exceed those of the former. Neither does the number of young depend upon the frequency of coition; for, in the sow and bitch, one embrace is sufficient for the production of a numerous progeny. The longer or shorter time occupied in discharging the semen, seems likewise to have no influence on the number of young; for the dog remains long only in consequence of an obstacle arising from the structure of the parts; and, though the boar is retained by no such obstacle, and continues longer than most animals; yet no conclusion can be drawn from this circumstance in favour of a numerous progeny, since the cock requires but an instant to impregnate all the eggs which a hen can produce in the course of a month. I shall afterwards unfold the ideas I have here accumulated, solely with a view to demonstrate, that a simple probability, or conjecture, when founded on physical relations, brings more light and greater advantages than the whole group of final causes put together*.

To the peculiarities already related, some others remain to be added. The fat of the hog differs from that of almost every other quadruped,

* This is another bold and inconclusive attack upon final causes. See the note vol. II. p. 70.

ped, not only in its consistence and quality, but in its position in the body of the animal. The fat of man, and of those animals which have no suet, as the dog, the horse, &c. is pretty equally intermixed with the flesh. The suet of the sheep, goat, deer, &c. is placed at the extremities of the flesh. But the lard of the hog is neither mixed with the flesh, nor collected at its extremities. It covers the whole animal in the form of a thick, distinct, and continued stratum between the flesh and the skin. This phenomenon likewise takes place in the whale and other cetaceous animals.

What is still more singular, the hog sheds not his fore-teeth; they continue to grow during life. He has six cutting teeth in the under jaw, and a corresponding number in the upper. But, by an irregularity, of which there is not another example in Nature, the figure of the six teeth in the under jaw is different from that of those in the upper; for, instead of being sharp and cutting, the latter are long, cylindrical, blunt at the points, and form nearly a right angle with those in the upper jaw; so that their extremities apply to each other in a very oblique manner.

Tusks, or very long canine teeth, are peculiar to the hog, and two or three other species of animals. They differ from other teeth, by extending out of the mouth, and continuing to grow during life. In the elephant and sea-cow,

cow, they are cylindrical, and several feet in length. In the wild boar and male hog, I have seen the tusks from nine to ten inches long. They are flat, sharp, and bend in a circular form. They sink very deep in the socket; and, like those of the elephant, they have a cavity at their superior extremity. The tusks of the elephant and sea-cow are placed in the upper jaw, and there are no canine teeth in the under jaw. But the male hog and wild boar have tusks in both jaws; and those of the under jaw are most useful to the animal, and also most dangerous; for it is with them that the wild boar wounds those who attack him.

The common sow, the wild sow, and the castrated domestic boar, have likewise four canine teeth in the under jaw; but they are much less than those of the male, and never extend beyond the mouth. Beside these sixteen teeth, namely, twelve cutting and four canine, they have twenty-eight grinders, which make forty-four in all. The tusks of the wild boar are larger, his snout stronger, and his head longer than those of the domestic hog. His feet are also larger, his toes more separated, and his bristles is always black.

Of all quadrupeds, the hog is the most rude and brutal. The imperfections of his form seem to have an influence on his nature and dispositions. All his habits are gross; all his appetites are impure; all his sensations are confined

nied to a furious lust, and a brutal gluttony. He devours indiscriminately every thing that comes in his way; even his own progeny, the moment after their birth. This voraciousness seems to proceed from the perpetual cravings of his stomach, which is of an immoderate size; and the grossness of his appetites, it is probable, arises from the bluntness of his senses of taste and of feeling. The rudeness of the hair, the hardness of the skin, and the thickness of the fat, render these animals less sensible to blows. Mice have been known to lodge upon a hog's back, to eat his skin and his fat, without his showing any marks of sensibility. The other senses of the hog are very good. It is well known to the hunters, that the wild boar hears and smells at a great distance; for, in order to surprise him, they are obliged to watch him in silence during the night, and to place themselves opposite to the wind, that he may not perceive the smell, which never fails to make him turn back.

The imperfection of the senses of taste and feeling in the hog, is farther augmented by a leprous disease, which renders him almost totally insensible. This malady proceeds, perhaps, less from the texture of the flesh or skin, than from the natural dirtiness of the animal, and the corruption that must result from the putrid food he sometimes devours; for the wild boar, who generally lives upon grain, fruits, acorns, and roots,

roots, is not subject to this distemper; neither is the pig while it continues to suck. There is no method of preventing it, but by keeping the domestic hog in a clean stable, and feeding him with wholesome nourishment. His flesh will become excellent, and his fat firm and brittle, if he is kept for fifteen days or three weeks in a paved stable, without litter, and always clean, giving him only dry wheat to eat, and allowing him to drink very little. For this purpose, a *hog* of a year old, in good health, and half-fattened, should be chosen.

The ordinary method of fattening *hogs* is to give them plenty of barley, acorns, cabbages, boiled peas, roots, &c. and water mixed with bran. In two months they are fat; their lard is thick, but neither firm nor white; and their flesh, though good, is somewhat insipid. They may be fattened much cheaper in woody countries, which produce acorns, and other nuts, by leading them into the forests during autumn, when chesnuts, acorns, beech-mast, &c. fall and quit their husks. They eat indiscriminately all wild fruits, and soon fatten, especially if, on their return in the evening, they be served with lukewarm water mixed with a little bran and pease-meal. This drink makes them sleep, and take on fat to such a degree, that they sometimes are unable to walk, or move themselves. They fatten much sooner in autumn than in any other season, both because their

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food

food is more plentiful, and because they lose less by perspiration than in the summer months.

In fattening *hogs*, it is unnecessary to delay, as we do with other cattle, till they be full grown; for, the older they are, they fatten with more difficulty, and their flesh is not equally good. Castration, which ought always to precede the fattening of *hogs*, is generally performed at the age of six months, and in the spring or autumn; because great heat or great cold renders the wound dangerous or difficult to cure; for the operation is commonly performed by incision, though sometimes by a simple ligature. When castrated in spring, they are fattened the following autumn, and are seldom allowed to live two years. However, they continue to grow during the second, third, fourth, and even the fifth year. Those which are remarkable for their size and corpulence, are too old, and have been several times fed in the forest. The continuance of their growth seems not to be limited to four or five years. The boars kept for propagation grow larger during the sixth year; and the wild boar is larger and fatter, in proportion to the number of his years.

The life of the wild boar may be extended to twenty-five or thirty years*. Aristotle says, that hogs in general live twenty years; and adds, that both males and females are fertile till they arrive at the age of fifteen. They can en-
gender

* See La Venerie de du Fouilloux, p. 57.

gender at the age of nine or twelve months; but it is better to restrain them till they be eighteen months or two years. The first litter of the sow is not numerous; and, when only one year old, her pigs are weak, and even imperfect. She may be said to be in season at all times. Though full, she solicits the approach of the male. This may be regarded as an excess among animals; for almost every other species refuse the male after conception. The ardour of the sow, though almost perpetual, is, however, marked by paroxysms and immoderate movements, which always terminate by her wallowing in the mire. She, at the same time, emits a thick whitish fluid. She goes four months with young, brings forth in the beginning of the fifth; and soon afterwards solicits the male, is impregnated a second time, and, of course, brings forth twice a-year. The wild sow, which every way resembles the domestic kind, produces only once a-year. This difference in fertility is probably owing to want of nourishment, and the necessity of suckling her pigs much longer than the domestic sow, which is never allowed to nurse her young above fifteen days or three weeks. Only eight or nine of the litter are kept longer; the rest are sold. In fifteen days, pigs are excellent food. As many females are unnecessary, and as castrated hogs bring most profit, their flesh being best, only two females, and seven or eight males, are left with the mother.

The

The male chosen for propagation should have a thick body, rather square than long, a large head, a short flat snout, large depending ears, small fiery eyes, a large thick neck, a flat belly, broad thighs, thick, short legs, and strong, black bristles. White hogs are never so strong as the black kind. The sow ought to have a long body, a large belly, and long dugs. She should also be of a placid temper, and sprung from a prolific race. Immediately after conception, she should be separated from the male, who is apt to injure her. When she brings forth, she should be fed plentifully, and watched to prevent her from devouring some of her young. Still greater attention is necessary to keep off the male, who would destroy the whole litter. The females are covered in the beginning of spring, that the pigs may be brought forth in summer, and have time to acquire strength and become fat before winter. But, when two litters are wanted annually, the male is given in November, that the female may bring forth in March; and she is covered a second time in the beginning of May. Some sows produce regularly every five months. The wild sow, which produces but once a-year, receives the male in January or February, and brings forth in May or June. She suckles her young three or four months: She conducts, follows, and allows them not to separate from her till they be two or three years old; and it is not uncommon to see a
wild

wild sow accompanied with two or three litters. The domestic sow is not allowed to suckle her pigs above two months. At the end of three weeks, they are led to the fields along with the mother, to accustom them gradually to feed as she does. Five weeks afterwards, they are weaned, and get, every morning and evening, a little milk mixed with bran, or only lukewarm water and boiled vegetables.

Hogs are fond of earth-worms and particular roots, as those of the wild carrot. It is in search of these worms and roots, that they dig the ground with their snouts. The wild boar, whose snout is longer and stronger than that of the domestic kind, digs deeper, and always nearly in a straight line: But the common hog digs irregularly and more lightly. As they do much mischief in cultivated fields, they should be fed in the forests, or in fallow land.

Wild boars, which have not passed their third year, are called by the hunters *flock-beasts* (*bêtes de compagnie*); because, previous to this age, they do not separate, but follow their common mother. They never wander alone, till they have acquired strength sufficient to resist the attacks of the wolf. These animals, when they have young, form a kind of flocks; and it is upon this alone that their safety depends. When attacked, the largest and strongest front the enemy, and, by pressing all round against the weaker, force them into the centre. The domestic

meftic hogs defend themselves in the same manner, and have no occasion to be guarded by dogs. But, as they are obstinate and untractable, an active and robust man is unable to manage more than fifty of them. In autumn and winter, they are conducted to the woods, where wild fruits abound; in summer, they are led to moist grounds, where they find plenty of worms and roots; and, in spring, they are allowed to go on waste or fallow lands. They are led out twice a-day from March to October, and feed from the time that the dew is dissipated in the morning, till ten o'clock, and from two in the afternoon till the evening. In winter, they are let out only once a-day, when the weather is fine; for dew, snow, and rain, are hurtful to them. When overtaken with a storm, or even a great rain, they often desert the flock one after another, and run and cry till they arrive at the stable-door. The youngest cry oftenest, and loudest. This cry, which differs from the ordinary grunting, resembles the cries they utter when bound with ropes, in order to be slaughtered. The male cries less frequently than the female. The wild boar seldom cries, unless when he is wounded in combat. The wild sow cries oftener; and, when suddenly frightened, she blows with such violence as to be heard at a great distance.

Though extremely gluttonous, they never attack or devour other animals; but they sometimes eat putrid flesh. Wild boars have been observed

observed eating the flesh of horses, and the skin of the roebuck, and claws of birds have been found in their stomachs. But, perhaps, this proceeds more from necessity than instinct. It cannot, however, be denied, that they are very fond of blood, and of fresh and bloody flesh; for hogs devour their own young, and even infants in the cradle. Whenever they find any succulent, moist, or unctuous substance, they first lick, and then swallow it. In their return from the fields, I have seen a whole herd stop round a piece of new ploughed clay-land, which, though but slightly unctuous, they all licked, and some of them swallowed considerable quantities of it. Their gluttony, as formerly remarked, is equally gross as their nature is brutal. They have no sentiments which are very distinct. The pigs hardly know their mother, or, at least, they are extremely apt to mistake her, and to suck the first sow that will permit them. Fear and necessity seem to confer more sentiment and instinct upon wild hogs. The young are more attached to their mother, and she appears to be more attentive to them, than the domestic sow. In the rutting season, the male follows the female, and generally remains with her about thirty days in the thickest and most solitary recesses of the forest. He is then more ferocious than ever: When another male endeavours to occupy his place, he becomes perfectly furious; and they fight, wound, and often kill each other.

The

The wild sow is never furious but when her pigs are attacked: And it may, in general, be remarked, that, in almost all wild animals, the males, during the rutting season, and the females, after they bring forth, become more or less furious.

The wild boar is hunted with dogs, or killed by surprise during the night, when the moon shines. As he flies slowly, leaves a strong odour behind him, and defends himself against the dogs, and often wounds them dangerously, fine hunting dogs are unnecessary, and would have their nose spoiled, and acquire a habit of moving slowly by hunting him. Mastiffs, with very little training, are sufficient. The oldest, which are known by the track of their feet, should only be attacked: A young boar of three years old is difficult to hunt down; because he runs very far without stopping. But the older boars do not run far, allow the dogs to run near, and often stop to repel them. During the day, he commonly remains in his soil, which is in the most sequestered part of the woods. He comes out in the night in quest of food. In summer, when the grain is ripe, it is easy to surprise him among the cultivated fields, which he frequents every night. As soon as he is slain, the hunters cut off his testicles, the odour of which is so strong, that, in a few hours, it would infect the whole flesh. The snout of an old boar is the only part that is esteemed; but every part of the castrated and young boar, not exceeding one year

year fed, makes delicate eating. The pork of the domestic boar is still worse than that of the wild boar; and it can only be rendered fit for eating by castration and fattening. The ancients * castrated the young boars which they could carry off from their mothers, and returned them to the woods, where they grew fat, and their pork was much better than that of domestic hogs.

To those who live in the country, the profits arising from the hog are well known. Pork sells nearly as dear as beef; the lard brings double or triple the price; the blood, the intestines, the feet, the tongue, are all prepared and used as food. The dung of the hog is colder than that of other animals, and should not be used but in grounds which are too warm and too dry. The fat of the intestines and web, which differs from common lard, is employed for greasing axles of wheels and many other purposes. Sieves are made of the skin, and brushes, pencils, &c. of the bristles. The flesh of the hog takes salt better, and keeps longer than that of any other animal.

This species, though very numerous, and diffused over Europe, Asia, and Africa, existed not in the New Continent, till they were transported thither, and to most of the American islands, by the Spaniards. In many places they have multiplied

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* See Arist. Hist. animal. lib. 6. cap. 58.

greatly, and become wild. They resemble our boars; and their bodies are shorter, and their snout and skin thicker than the domestic hogs, which, in warm climates, are all black, like the wild boar.

By a ridiculous prejudice, which superstition alone could support, the Mahometans are deprived of this useful animal. They have been told that it is unclean; and, therefore, they dare not either touch or feed it. The Chinese, on the contrary, are extremely fond of pork. They rear hogs in numerous flocks, and pork is their most common food. This circumstance is said to have prevented them from embracing the religion of Mahomet. The Chinese hogs, as well as those of Siam and India, differ a little from the common kind. They are smaller, have shorter legs, and their flesh is whiter and more delicate. They are reared in several places of France; and they intermix and produce with the domestic hog. Numbers of them are reared by the Negroes; and, though there are few of them among the Moors, or in the countries inhabited by Mahometans; yet wild boars are as common in Asia and Africa as in Europe.

Hence these animals affect not any particular climate: But the boar, by becoming domestic, seems to have degenerated more in cold than in warm countries. A very slight alteration of climate is sufficient to change their colour. In the northern provinces of France, and even in Viverais,

Viverais, the hogs are generally white; but in Dauphiny, which is at no great distance, they are all black; and those of Languedoc, Provence, Spain, Italy, India, China, and America, are of the same colour. The hog of Siam has a greater resemblance to the common hog than to the wild boar. The ears furnish the most evident mark of degeneration; for they become more supple, soft, inclined, or pendulous, in proportion as the animal is altered, or rather as he has been softened by education in a domestic state: And, in fact, the ears of the domestic hog are more flexible, longer, and more inclined than those of the wild boar, which ought to be regarded as the model of the species.

SUPPLEMENT.



Viverris, the hogs are generally white; but in Dabbling, which is a great distance, they are black.

S U P P L E M E N T.

ence, Spain, Italy, India, China, and America, are of the same colour. The hog of Siam has

I have little to add concerning the hogs of Europe, of Siam, and of China, which intermix together, and therefore constitute but one species. Those of Europe are considerably larger than the other races; and their size might be still farther augmented, if they were allowed to live longer. Mr Colinson, Fellow of the Royal Society of London, informed me, by a letter dated January 30. 1767, that a hog, which was fattened by Mr Joseph Leastarm, and killed by one Meek, a butcher in Cheshire, weighed 850 pounds, including head, intestines, &c.

END of VOLUME THIRD.



Plate XX.



COMMON WILD BOAR

A. Bell sculpt.

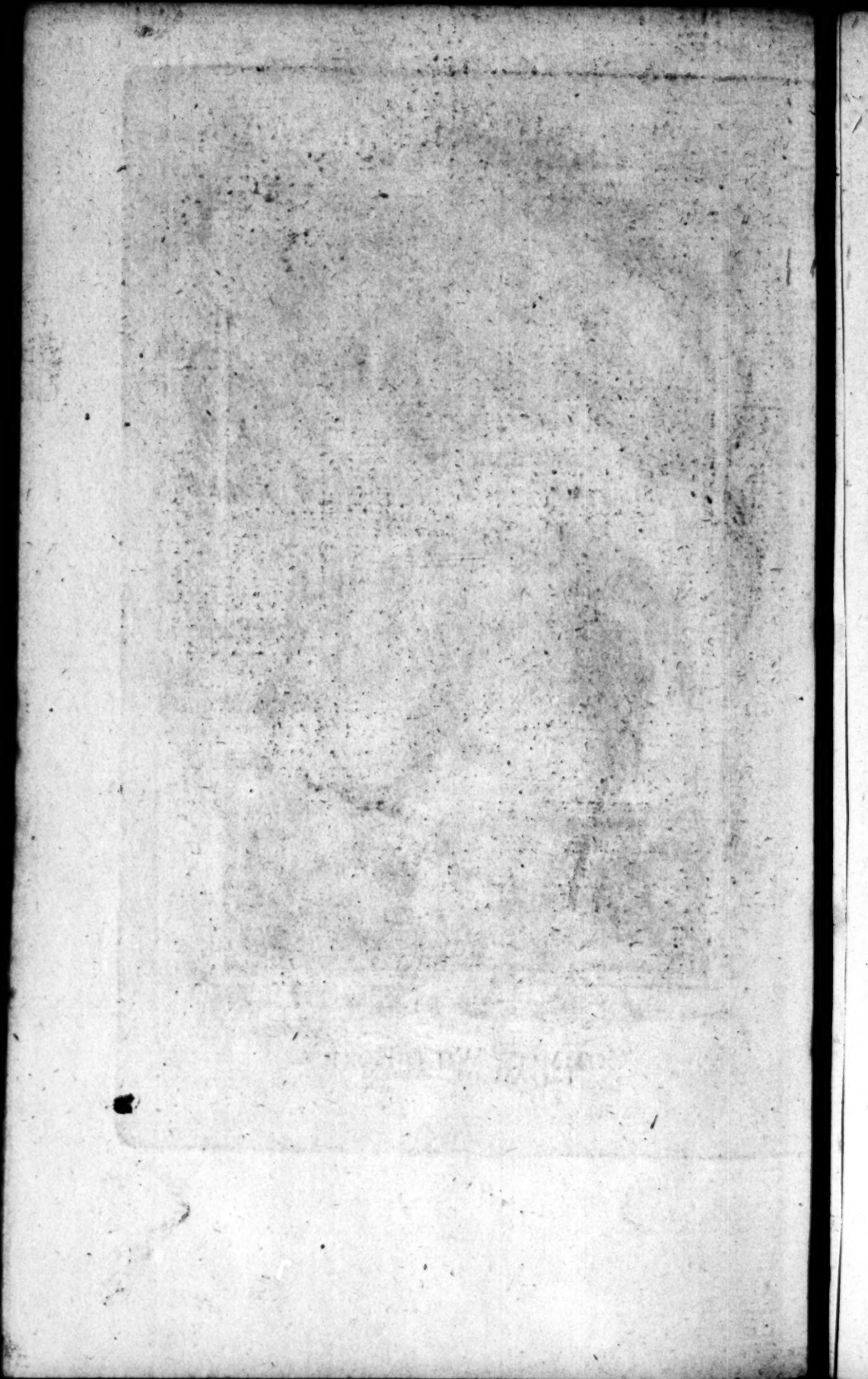


Plate XII.



A. Ball, Sculp.

BOAR of SIAM

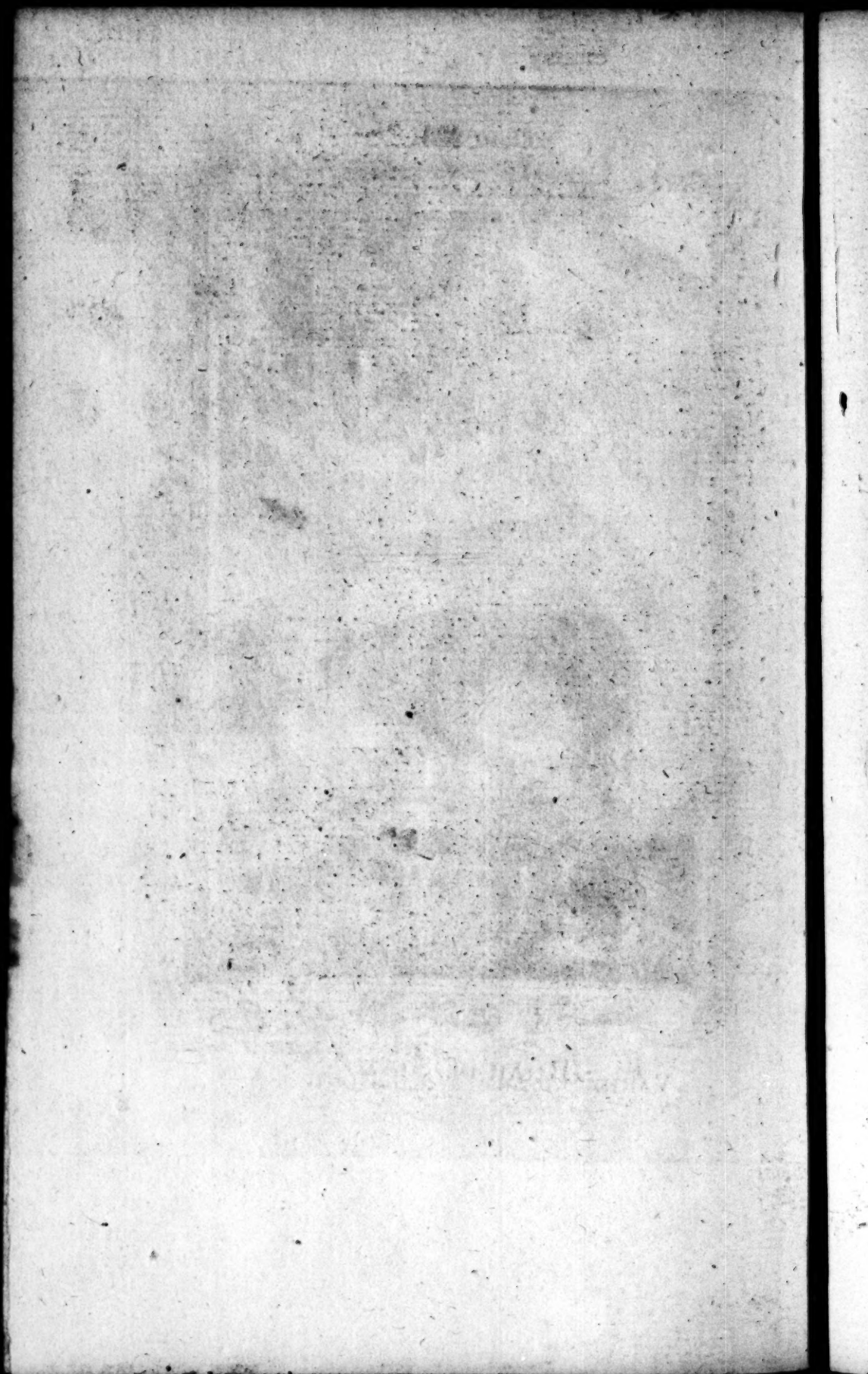


Plate XXII.



VARIETY of the WILD BOAR

A. Bell Sculp.

1854



W. D. B. & Co. New York

Plate XXIII.



1. YOUNG WILD BOAR

2. SUCKING PIG

A. Ball Sculp.

